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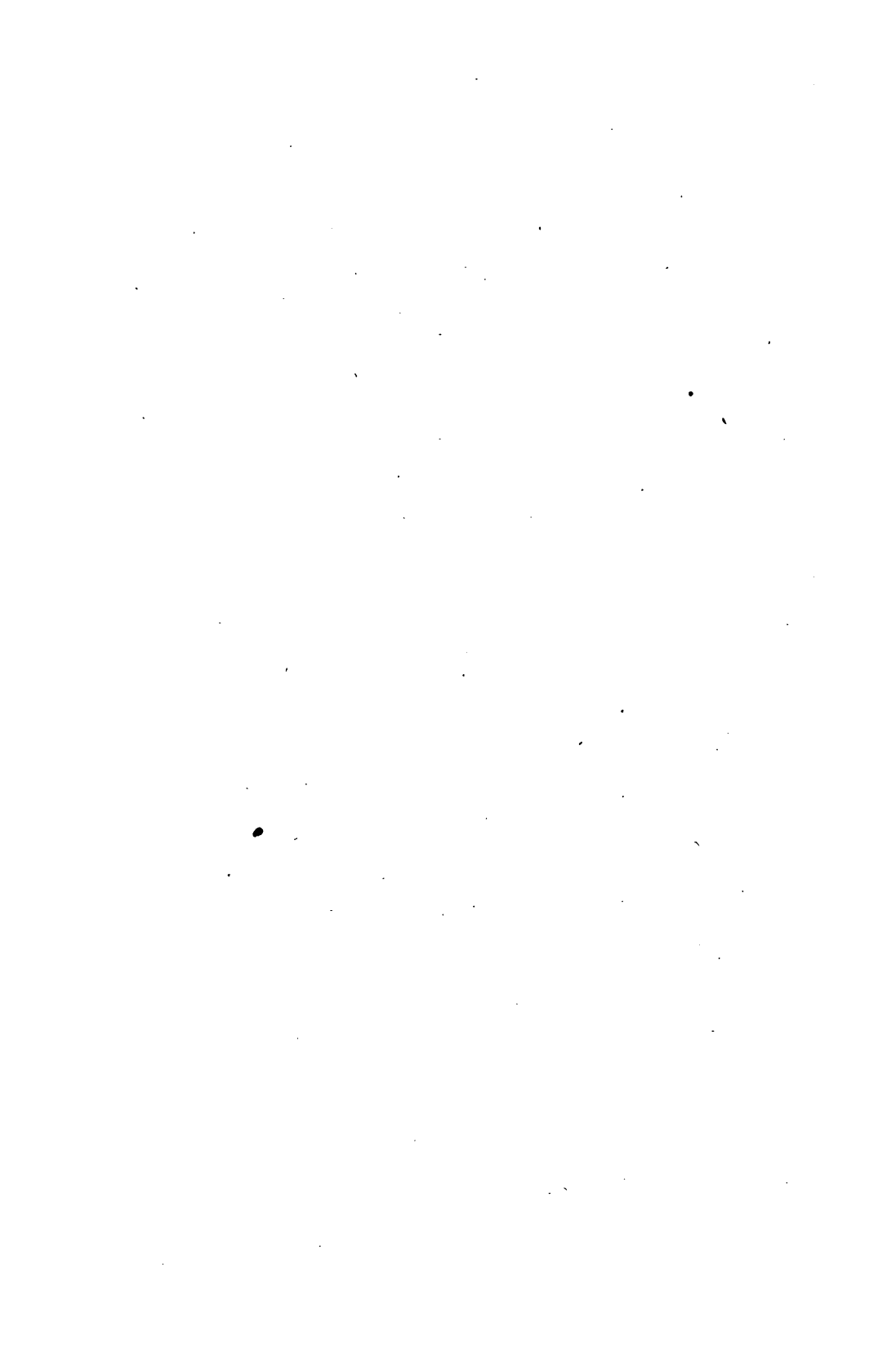
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**ARTILLERY OPERATIONS OF
THE NINTH BRITISH CORPS AT
MESSINES, JUNE, 1917**

**EDITED AT ARMY WAR COLLEGE
AUGUST, 1917**



**WASHINGTON
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*Adjutant General's Office
War Department*

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WAR DEPARTMENT,
WASHINGTON, August 11, 1917.

The following pamphlet on Artillery Operations of the Ninth British Corps at Messines, June, 1917, is published for the information of all concerned.

[62.1 A. G. O.]

BY ORDER OF THE SECRETARY OF WAR:

H. L. SCOTT,
Major General, Chief of Staff.

OFFICIAL:

H. P. MCCAIN,
The Adjutant General.

WAR DEPARTMENT,
THE ADJUTANT GENERAL'S OFFICE,
Washington, June 19, 1917.

To all officers of the Army:

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By order of the Secretary of War:

H. P. MCCAIN,
The Adjutant General.

CONTENTS.

	Page.
Introduction—Summary of artillery operation.....	7
Artillery instructions for offensive, Ninth Corps (with maps).	15
Heavy artillery, Order No. 39.....	69
Telephone and telegraph communications (with maps).....	81
Examples of reports.....	95
Summary of intelligence, Second Army (with map and 4 photographs).....	114

SUMMARY OF ARTILLERY OPERATIONS.

Systematic trench bombardment and wire cutting was commenced about May 21, 1917, and was intensified about May 28. During the period May 28 to June 6, inclusive, 297 trench bombardments were carried out with aeroplane observation. Wire was cut along front and support lines by trench mortars and 18-pounder batteries, and on rear lines by 6-inch howitzers with aeroplane observation.

Practice barrages were carried out along the whole of the Second Army front on June 3 and 5, 1917, and the result in each case was checked by aeroplane photography.

Night firing commenced on May 27-28, and is still being continued, barraging being maintained on enemy's communications and shelling of billets, headquarters, and villages in back area taking place with long-range pieces.

Since June 7, field artillery have continued registration from new forward positions and have harassed enemy's forward area.

Heavy artillery has continued bombardment of strong points, particularly those in neighborhood of BATTLE WOOD and LA POTTERIE FARM system, and subsequently on the WARNETON line.

Favored by comparatively good visibility an unprecedented amount of destructive counter-battery work was done on our offensive front in the last 10 days prior to the day of attack. Four hundred and thirty-eight destructive shoots were carried out on hostile batteries, giving an average of 12 per day for each of our attacking corps.

Since June 7 systematic counter-battery work has been continued with the utmost vigor on German batteries in their new positions immediately they were located.

Two tables are attached showing—

(1) Number of destructive shoots on each corps front per day from May 28 to June 6 and from June 7 to 11, inclusive.

(2) Number of hostile batteries neutralized during same periods.

(3) Number of our batteries engaged by the enemy during the same periods.

(4) Allotment of heavy howitzers between counter-battery work and bombardment tasks.

8 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Second Army.—Summary of counter-battery work.

TO DAY OF ATTACK.

Date.	Eighth Corps.			Tenth Corps.			Ninth Corps.			Second Anzac.		
	Our destructive shoots.	Enemy batteries neutralized.	Our batteries engaged.	Our destructive shoots.	Enemy batteries neutralized.	Our batteries engaged.	Our destructive shoots.	Enemy batteries neutralized.	Our batteries engaged.	Our destructive shoots.	Enemy batteries neutralized.	Our batteries engaged.
May 28.....	9	20	6	5	37	4	9	35	5	7	7	7
29.....	6	10	2	2	7	1	7	53	4	6	7	7
30.....	2	25	5	4	41	2	5	12	1	5	7	7
31.....	14	2	1	18	1	6	12	1	6	7	1	1
June 1.....	11	29	2	7	39	18	8	34	5	16	91	4
2.....	7	18	2	5	33	10	18	35	14	15	34	3
3.....	7	17	.....	7	9	8	8	28	3	17	82	7
4.....	7	22	2	25	79	25	9	35	11	10	127	6
5.....	13	50	7	28	92	6	35	28	13	18	113	11
6.....	11	29	11	24	38	8	28	23	18	24	112	7
Total.....	73	234	39	108	393	83	133	295	74	124	587	57

DURING AND AFTER DAY OF ATTACK.

June 7.....	6	40	3	3	170	4	2	120	1	3	102	6
8.....	11	57	4	10	74	2	3	33	1	9	150	.....
9.....	14	44	1	6	74	.....	2	15	.....	6	223	.....
10.....	8	79	1	.....	115	1	.....	14	1	14	141	2
11.....	1	95	.....	3	111	.....	13	.....	.....	170	.....	.....
Total.....	40	315	9	22	544	7	20	182	3	202	616	8

To day of attack:

Total number of destructive shoots.....	438
Total number of our batteries engaged (some lightly).....	253
Total number of our guns knocked out (and some carriages).....	36

During and after day of attack:

Total number of destructive shoots.....	284
Total number of our batteries engaged (some lightly).....	27
Total number of our guns knocked out (and a number of carriages).....	15

Allotment of 6, 8, and 9.2-inch howitzers, between counter-battery and bombardment tasks, on day of attack.

Corps.	Normal.		Throughout the day.		From zero hour to zero +30'.	
	Counter battery.	Bombardment.	Counter battery.	Bombardment.	Counter battery.	Howitzer battery, etc.
Tenth.....	48	132	80	100	92	88
Ninth.....	52	116	68	100	80	88
Second Anzac.....	52	116	92	76	92	76
Total.....	152	364	240	276	264	254

On June 5 and 6 during the intense period of counter-battery work the allotment was substantially the same as given for the period zero hour to zero +30' above.

NINTH CORPS INSTRUCTIONS FOR THE OFFENSIVE.

All orders and instructions concerning the offensive which it may be necessary to issue up to and including the day before zero will be issued in the form of "Ninth Corps Instructions for the Offensive." These instructions will be divided into three parts, the orders or instructions in each part being numbered consecutively from No. 1 onwards.

Part 1. General staff (maps marked "G").

Part 2. Artillery (maps marked "A").

Part 3. Administrative (maps marked "Q").

The recipient of "Ninth Corps Instructions for the Offensive" is responsible for the custody of the documents and maps and that only such portions of their contents as may be necessary are communicated to their subordinates from time to time as the situation demands.

Copies of "Ninth Corps Instructions for the Offensive" will be issued to—

- Second Army, Sixteenth Divisional Artillery.
- Tenth Corps, Nineteenth Divisional Artillery.
- Eighth Corps, Thirty-sixth Divisional Artillery.
- Second Anzac Corps, Eleventh Divisional Artillery.
- Fifty-third Squadron R. F. C., Sixteenth Division "G".
- C. B. staff officer, Nineteenth Division "G".
- No. 5 Balloon Company, Thirty-sixth Division "G".
- Ninth Corps Mounted Troops, Eleventh Division "G".
- H. A. Ninth Corps, Second Brigade H. B. M. G. C.
- Corps commander, A Battalion H. B. M. G. C.
- C. E. Ninth Corps, B Battalion H. B. M. G. C.
- A. D. signals, D. A. and Q. M. G.
- Ninth Corps "G," R. A. Fourteenth Corps.

INDEX TO NINTH CORPS INSTRUCTIONS FOR THE OFFENSIVE.

[Part II.—Artillery.]

	Para.
Number of guns.....	1
Rôles allotted to heavy artillery.....	2
Numbering and marking of positions.....	3
Grouping and locations.....	4
Method of grouping heavy artillery for bombardment.....	5
Method of grouping heavy artillery for counter-battery work.....	6
Method of grouping distant barrage guns.....	7
Method of grouping field artillery.....	8
Creeping and standing barrage.....	9
Observation posts.....	10
Communications.....	11
Dump of ammunition at the guns.....	12
Work on gun positions.....	13
Artillery policy.....	14
Wire cutting.....	15
Description of days and times.....	16
4.5-inch howitzers for counter-battery work.....	17
Forward guns.....	18
Forward move of field artillery.....	19
Ammunition remaining at the guns.....	20
Datum points.....	21
Care of matériel.....	22
Additional batteries to support nineteenth and thirty-sixth divisions.....	23
60-pounders to support divisions.....	24
Ammunition expenditure.....	25
Guns of opportunity.....	26
Wire cutting by siege howitzers.....	27
Night firing, barrage communications.....	28
Forward O. P.'s.....	29
Special officers.....	30

12 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

	Para.
Employment of gas shell by the enemy.....	31
Forward move of field artillery.....	32
Designations.....	33
Smoke and gas shell.....	34
Tasks for forward guns.....	35
Advance of heavy artillery.....	36
Advance of additional heavy artillery.....	37
Synchronization of watches.....	38
Captured guns.....	39
Counter-battery area.....	40
Bombardment.....	41
Barraging communications.....	42
Action on Z day.....	43
Bombardment.....	44
Counter-battery work.....	45
Gas shell.....	46
4.5-inch howitzers for counter-battery work.....	47
Barraging communications.....	48
Ammunition.....	49
Gas shell.....	50
Gas-shell bombardments.....	51
4.5-inch howitzers for counter-battery work.....	52
S. O. S. call from aeroplane.....	53
Army demonstration.....	54
Further advance to OOSTAVERNE LINE.....	55
Artillery defense of the OOSTAVERNE LINE.....	56
Counter-battery work on Z day.....	57
Counter-battery work on Y/Z night.....	58
Distant-barrage guns.....	59
Second Army demonstration.....	60
S. O. S. on OOSTAVERNE LINE.....	61
S. O. S. on BLACK LINE.....	62
Further advance to OOSTAVERNE LINE.....	63

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 13

Appendix:

	Page.
A 1. Guns allotted to Ninth Corps.....	42
A 2. Roles of heavy artillery.....	43
A 3. Locations and groupings of field and heavy artillery	44
A 4. Suggested divisional artillery communications.....	47
A 5. Allotment of battle O. P.'s to R. A. Ninth Corps...	50
A 6. Cooperation with Royal Flying Corps.....	51
A 7. Field artillery forward positions.....	56
A 8. Special bombardment—WYTSCHAETE.....	57
A 9. Practice barrage.....	59
A 9/1. Practice barrage No. 2.....	61
A 10. Notes on the use of lethal and lachrymatory shells.	63
A 11. Second Army demonstration.....	65
A 12. Second Army demonstration.....	67
A 13. Corps counter-battery and zone-call areas.....	68
A 14. Further advance from black line—rates of fire of creeping and standing barrages.....	69

[These instructions were issued on various dates from Apr. 2, 1917, to June 6, 1917
(Z minus 1 day).]

NINTH CORPS.—INSTRUCTIONS FOR THE OFFENSIVE.

PART 2.—ARTILLERY.

1. Number of guns.

The number and nature of guns and howitzers allotted for the support of the Ninth Corps are shown in Appendix A 1 attached.

2. Rôles allotted to heavy artillery.

The different rôles allotted to the heavy artillery are shown in Appendix A 2 attached.

3. Numbering and marking of positions.

(a) All positions will be given numbers as follows:

(i) *Field artillery*.—A number preceded by the letter "K."

(ii) *Heavy artillery*.—A number preceded by the letters "K H."

(iii) *Field artillery forward positions*.—A number preceded by the letters "F K."

(iv) *Heavy artillery forward positions*.—A number preceded by the letters "F K H."

(b) A sequence of numbers has been allotted to each division.

(c) All positions will be clearly marked with a board showing the number of the position and exact location of each gun will in addition be marked as follows:

Thirty-sixth Division: A small white flag.

Sixteenth Division: A small red flag.

Nineteenth Division: A small blue flag.

Ninth Corps Heavy Artillery: A screw iron wire post.

It is necessary that this should be done so that routes now being selected for railways shall, as far as possible, avoid interfering with battery positions.

4. Grouping and locations.

The locations and groupings of heavy and field guns are shown in Appendix A 3 attached.

16 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

5. Method of grouping heavy artillery for bombardment.

(a) The bombardment howitzers are divided into five groups, vide Appendix A 3. Each battery of these groups has an arc of fire which includes the whole of the area over which the corps will attack.

(b) A group will be detailed to cover approximately the front of each attacking division and will be responsible, under orders of the B. G. H. A., for destruction in its own zone; a liaison officer from each of these groups will be attached to the staff of the C. R. A. of the division with which the group is working during the bombardment and subsequent phases of the operations.

These three groups will be the HOSFICE, KEMMEL, and LA CLYTTÉ groups.

(c) The two remaining groups—SUPERHEAVY and HALLEBAST—will engage such targets as the B. G. H. A. may think advisable, and will assist groups covering the divisions as may be required.

(d) This system will be adhered to throughout the operations. The B. G. H. A. is thus able at any time to concentrate all or part of his command on any point that may require it.

6. Method of grouping heavy artillery for counter-battery work.

The counter-battery guns and howitzers are divided into four groups, vide Appendix A 3.

7. Method of grouping distant barrage guns.

These guns are attached to groups from the point of view of facility in communications, vide Appendix A 3.

8. Method of grouping field artillery.

(a) As shown in Appendix A 3. The guns and howitzers have been arranged in groups of approximately six batteries and have been grouped as conveniently as possible for command, supply, and communications.

(b) The groups throughout the operations will work in lanes, though their arcs of fire will enable them to cover the whole divisional front.

(c) A senior liaison officer from each group will be attached to the infantry brigade that his group is supporting.

9. Creeping and standing barrage.

Approximately two-thirds of the 18-pounders allotted to each division will form the creeping barrage.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 17

The remaining 18-pounders and 4.5-inch howitzers will form the standing barrage—4.5-inch howitzers will lift when the creeping barrage approaches within a minimum distance of 100 yards.

10. Observation posts.

Battle O. P.'s (for both heavy and field artillery) will be allotted on the rough basis of 1 O. P. to 3 batteries.

Communication will be arranged for on the principle of O. P. to battery through group headquarters exchange. This system economizes wire and is considered the most efficient.

In addition to battle O. P.'s certain special O. P.'s for wire cutting, etc., will be required for use prior to the hour of attack and will have to be arranged for.

Allotment of battle O. P.'s is shown in Appendix A 5.

11. Communications.

(a) A diagram of suggested communications for a divisional artillery is attached as Appendix A 4.

(b) A system of establishing communications during and after the advance has been arranged in consultation with the A. D. A. S., and will be on the principle of a trunk line system, laid to the cable head in each infantry brigade sector prior to the hour of attack, the lines to be carried on as the attack advances. The principles laid down in S. S. 148 "Forward intercommunication in battle" will be strictly adhered to.

Advance intelligence officers and F. O. O.'s will communicate through this system and arrangements will be elaborated to perfect it.

12. Dump of ammunition at the guns.

Accommodation is to be provided for dumps at the guns on the following scale:

	Rounds per gun.
18-pounder.....	1,300
4.5-inch howitzer.....	1,100
60-pounder.....	1,000
6-inch howitzer.....	1,100
6-inch gun.....	500
8-inch howitzer.....	650
9.2-inch howitzer.....	650
12-inch howitzer.....	350
15-inch howitzer.....	150

Dumps of 18-pounder ammunition and cartridges of other natures should be subdivided into smaller dumps, so that any explosion may be confined to a single dump.

18 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

13. Work on gun positions.

The order of precedence of work on gun positions will be as follows:

(a) Construction of approaches and platforms, together with screening and camouflaging, to which the enemy must get accustomed.

Camouflaging should be large enough to admit of the tracks of men working on the position being also hidden

(b) Construction of bombproof B. C.'s dugout and telephone dugout.

(c) Construction of weather proof protection for ammunition.

(d) Construction of protection for detachments.

(e) Protection for the guns.

The principle to work on is that *all* positions are, as soon as possible, to be made "fightable"—which includes the provision of a B. C.'s and telephone bombproof.

14. Artillery policy.

(a) From to-morrow, May 11, until further orders the artillery policy of the Ninth Corps must be primarily systematic and destructive counter-battery work, and secondly, organized shoots for the destruction of any trench points which have an important bearing on the forthcoming operations.

(b) The governing factor in carrying out the above policy is not the ammunition expenditure but the life of the guns.

The following number of rounds per gun per day should not be exceeded:

12-inch howitzer.....	20
9.2-inch howitzer.....	50
8-inch howitzer.....	80
6-inch howitzer.....	100
60-pounder.....	20

(c) Except for counter-battery work, 8 and 9.2-inch howitzers will only be used for the destruction of trench objectives which are beyond the power of the 6-inch howitzers.

(d) B. G. H. A. will arrange with divisions direct to have trench points, which have been bombarded, kept under intermittent field gunfire during the night.

15. Wire cutting.

Deliberate wire cutting with 18-pounders will be commenced forthwith (May 13, 1917) on divisional fronts. Ammunition for this purpose can be used as required. Wire which will be dealt with later by 2-inch trench mortars should not be attacked.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 19

In this connection it is notified for information that during recent operations wire on the front of the Sixth Corps was successfully cut by 18-pounders with H. E. up to a range of 4,000 yards.

Map¹ showing wire to be cut by divisional artillery is issued herewith.

16. Description of days and times.

In making references to times before or after which operations will commence, the following nomenclature will be adopted in future:

(a) *Referring to days*.—"Z" day is the day on which operations take place.

One day before "Z" = "Y" day.

Two days before "Z" = "X" day.

Three days before "Z" = "W" day.

Four days before "Z" = "V" day.

Five days before "Z" = "U" day.

Days before "U" day will be referred to as "Z" minus 6, "Z" minus 7, "Z" minus 8, etc.

One day after "Z" = "A" day.

Two days after "Z" = "B" day.

Three days after "Z" = "C" day.

Days after "C" day will be referred to as "Z" plus 4, "Z" plus 5, "Z" plus 6, etc.

(b) *Referring to hours on "Z" day*.—Zero is the exact time at which operations will commence and times will be designated in hours and minutes plus or minus from zero, even if they encroach on "Y" day.

17. 4.5-inch howitzers for counter-battery work.

One 4.5-inch howitzer battery per division will be held available for counter-battery work after zero. Positions to be occupied by these batteries are K 30, K 70, and K 81. Necessary registration will be carried out prior to zero under instructions to be issued by the counter-battery staff officer.

Ninth Corps Heavy Artillery will arrange communication between these batteries and the nearest counter-battery group.

18. Forward guns.

Thirty-second Divisional Artillery has been allotted to Ninth Corps and will be attached to Thirty-sixth Divisional Artillery. These batteries will occupy positions in the STUVERBEEK Valley in N 28 d, N 29 c, and N 35 a. These guns will be allotted tasks by R. A. Ninth Corps and they will not be available for inclusion in Thirty-Sixth division barrage.

¹ This map is not in this publication.

20 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Except for necessary registration the guns will not fire before zero. The two 4.5-inch howitzer batteries will be used for counter-battery work—Ninth Corps Heavy Artillery will arrange for the necessary communication to the nearest counter-battery group.

The dumps at these positions will be made up to 1,300 rounds per 18-pounder and 1,100 rounds per 4.5-inch howitzer.

List of locations and grouping of these batteries is shown in Appendix A 3.

19. Forward move of field artillery.

(a) (i) Divisions will select forward positions for batteries as under on the general line STUIVERBEEK—HARINGHEBEEK—WYTSCHAETE-BEEK.

Sixteenth Division.—Two field artillery brigades.

Nineteenth Division.—Two field artillery brigades.

Thirty-sixth Division.—Two field artillery brigades.

(ii) Batteries will be detailed to be in readiness to move forward after the capture of the BLACK LINE to occupy these positions.

Necessary communications will be arranged for before zero and, if time permits, a command and telephone bombproof should be constructed.

Teams will be detailed to be in readiness to take the guns forward and routes will be carefully reconnoitered and marked with flags.

The double rôle of these batteries will be:

(1) To form a protective barrage in front of the BLACK LINE.

(2) To support the further advance to the OOSTAVERNE LINE between O 28 b 5.2 and O 16 c 4.2.

(iii) As some of the positions selected are necessarily very exposed, the question of sending forward a single gun per battery to carry out necessary registration before Z-day, will be left to the discretion of C. R. A.'s of divisions.

Battery boards for these positions will be prepared and divisional artilleries will make all other possible preparations before Z-day to facilitate the rapid opening of fire when batteries move into position.

(iv) List of locations of positions to be occupied are attached—Appendix A 7.

(v) 300 rounds of boxed ammunition per 18-pounder gun and 4.5-inch howitzer will be dumped at the positions before zero.

(vi) No moves of batteries are to take place without reference to R. A. Ninth Corps.

20. Ammunition remaining at the guns.

Divisions should aim at having the following number of rounds with batteries after the capture of the BLACK LINE:

- (a) *With batteries under orders to move forward vide paragraph 19.*—100 rounds per 18-pounder and 4.5-inch howitzer.
- (b) *With other batteries.*—500 rounds per 18-pounder and 4.5-inch howitzer, of which 300 rounds will be boxed.

21. Datum points.

In order to avoid possible confusion in observation, divisions will select datum points on their own front.

22. Care of matériel.

Arrangements will be made at all gun positions for an adequate supply of water and the necessary matériel for sponging out and cooling guns.

Except when the maximum volume of fire is required as, for instance, immediately prior to the infantry assault, arrangements will be made to rest at least one gun per battery in turn. While resting guns will be carefully sponged out, cooled, thoroughly examined and necessary adjustments made.

The equipment of gun spares at the battery is to be kept up to establishment. All broken or defective spare parts are to be exchanged or repaired.

The instructions contained in S. S. 114, "Notes on care of guns during prolonged bombardments," dated March, 1917, will be carefully studied.

23. Additional batteries to support Nineteenth and Thirty-sixth Divisions.

After the capture of the BLUE LINE, from zero plus 1 hour 40 minutes onwards, three 18-pounder batteries of the artillery supporting the Sixteenth Division will be allotted to each of the Nineteenth and Thirty-sixth Divisions, to support the further attack of these divisions.

The tasks for these batteries will be allotted by C. R. A.'s Nineteenth and Thirty-sixth Divisions, respectively.

These batteries will again come under the orders of C. R. A. Sixteenth Division at zero plus 5 hours 10 minutes.

24. 60-pounders to support divisions.

From zero onwards one 60-pounder battery (6 guns) per division will support the attacks of the Sixteenth, Nineteenth, and Thirty-sixth Divisions.

22 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

The general rôle of these guns will be to keep under fire any areas on the eastern slope of the MESSINES-WYTSCHAETE RIDGE from which long-range indirect machine-gun fire might hold up the attack. The guns will search and sweep so as to bring under fire any parties of the enemy who may be retiring from or approaching the trenches in the vicinity. Orders for the action of these guns will be issued by B. G. H. A. after consultation with divisions.

B. G. H. A. will report to R. A. Ninth Corps which batteries are detailed by him for the above tasks.

25. Ammunition expenditure.

Reference paragraph 14 (b): The number of rounds per gun per day, which should not be exceeded, will now be raised to—

12-inch howitzer	50
9.2-inch howitzer	80
8-inch howitzer	100
6-inch howitzer	150
60-pounder	40

Dated May 25, 1917.

26. Guns of opportunity.

In order that each divisional commander may be able to deal with an unforeseen situation arising after zero, he may release from his barrage, on each infantry brigade front and without reference to the corps, up to a force of—

Two 18-pounder batteries.

One 4.5-inch howitzer battery.

One 6-inch howitzer battery.

These batteries will be earmarked for this duty and careful arrangements will be made *beforehand* to insure that the withdrawal of any or all of these batteries will not leave gaps in the barrage. Guns forming the barrage or carrying out tasks on the flanks of divisions will not be allotted for this purpose.

27. Wire cutting by siege howitzers.

Wire cutting by siege howitzers with 106 fuzes will commence on Z minus 10 day.

The daily program for wire cutting should be elastic so as to insure that full advantage is taken of any day suitable for aeroplane observation.

28. Night firing, barraging communications.

Deliberate night firing with the field artillery will commence at 10 p. m. on Z minus 11 day.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 23

Divisions will be responsible for barraging the communications in their own zone-call areas, as allotted in Appendix A 6, paragraph F. Special attention will be paid to the various lines of approach crossing the MESSINES-ST. ELOI ROAD.

The ammunition to be fired by 18-pounders will average 500 rounds per division per night, in addition to what is fired with the special object of keeping the wire open.

Barraging communications and night firing with 4.5-inch howitzers, 60-pounders, and 6-inch Mark VII guns will commence at 10 p. m. on Z minus 7 day.

Special instructions for this will be issued later.

29. Forward O. P.'s.

As soon as the BLACK LINE is captured F. O. O.'s will be pushed forward to the MESSINES-WYTSCHAETE RIDGE and communication back established—either by visual or through the brigade forward station as laid down in S. S. 148 "Forward intercommunication in battle." On no account are single, i. e., earth-return circuits, to be laid anywhere in the Ninth Corps area. Only twisted or armored cable is to be used.

If divisions decide to lay direct lines to connect the batteries in forward positions (vide par. 19) to the O. P.'s on the ridge, effort should be concentrated on laying and maintaining one line per group. Each group headquarters moving forward will take their wireless mast with them.

30. Special officers.

From Z minus 6-day to Y-day, inclusive, divisional artilleries will each detail a special officer to watch the effect of the bombardment in their own sector and to report on any points of interest noticed. Special attention should be paid to the action of the hostile artillery.

Reports to be forwarded so as to reach R. A. Ninth Corps by the first D. R. L. S. on the following morning.

31. Employment of gas shell by the enemy.

The following extract from a German document issued by the chief of the general staff of the army in the field, and dated 21-3-17, confirms the supposition that the enemy will employ gas shells for neutralization fire against our batteries:

"The general appreciation of the value of gas shell has now risen very much, as is proved by the high demands. Although the proper recognition of the useful nature of gas-shell bombardments is very gratifying, the general principle of economy has in this case to be considered to a special degree, as the supplies are limited. It is therefore of special importance to have a sufficient amount of gas shell in the battery positions, in order at the right moment, when

24 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

the enemy is starting attacks on a larger scale, to neutralize the enemy's artillery and thus, at the same time, nip the enemy's infantry attack in the bud. Small harassing bombardments are to be confined to special cases."

Divisional artilleries and Ninth Corps Heavy Artillery will satisfy themselves that batteries neglect no measure which will insure that the service of the guns is maintained, even though a battery is being subjected to a bombardment by gas shells.

32. Forward move of field artillery.

(1) *In addition* to the two brigades per division already ordered to be in readiness to advance (vide par. 19), the following further forward moves of batteries will take place on receipt of orders from R. A. Ninth Corps:

(a) *After the capture of the Black Line.*—Two brigades of the artillery supporting the Nineteenth Division will move forward to the WYTSCHAETEBEEK. Two brigades of the artillery supporting the Sixteenth Division will move forward to "No MANS LAND"—these brigades will not move until the first two brigades of the Sixteenth Division are in position in the HARINGHEBEEK.

(b) *After the capture of the Oostaverne Line.*—A further two brigades of the artillery supporting the Sixteenth Division will advance to positions on the western slopes of the MESSINES-WYTSCHAETE RIDGE.

33. Designations.

The field artillery covering the Sixteenth, Nineteenth, and Thirty-sixth Divisions will be known as the—

Sixteenth Divisional Artillery Group.

Nineteenth Divisional Artillery Group.

Thirty-sixth Divisional Artillery Group.

34. Smoke and gas shell.

(a) The allotment of smoke and gas shell is given below:

		Sixteenth Divi- sional Artillery.	Nine- teenth Divi- sional Artillery.	Thirty- sixth Divi- sional Artillery.	Heavy Artillery.
60-pounder	D C B R.....	Nil.	Nil.	Nil.	400
	D S K.....	Nil.	Nil.	Nil.	100
	D P S.....	Nil.	Nil.	Nil.	1,200
	B S K.....	950	950	950	Nil.
4.5-inch howitzer ..	B C B R.....	2,284	2,284	2,284	Nil.
	B V N.....	509	509	509	Nil.
	B J B R.....	369	369	369	Nil.
	B smoke.....	500	Nil.	Nil.	Nil.
18-pounder, A smoke		Nil.	Nil.	4,000	Nil.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 25

For counterbattery work.

60-pounder..	D C B R.....	1,064		
	D S K.....	254		
	D F S.....	3,608		
<hr/>				
		Sixteenth Divi- sional Artillery.	Nine- teenth Divi- sional Artillery.	Thirty- sixth Divi- sional Artillery.
<hr/>				
4.5-inch howitzer..	B S K.....	427	427	1,275
	B C B R.....	1,027	1,027	3,085
	B V N.....	229	229	688
	B J B R.....	226	226	679

(b) The ammunition allotted for counterbattery purposes will be sent up to batteries detailed for counterbattery work after zero.

The ammunition allotted to Thirty-sixth Divisional Artillery will be equally distributed between the three batteries allotted for that purpose (including 2 batteries of Thirty-second Divisional Artillery).

(c) The ammunition allotted to heavy artillery will be sent up to batteries which will be detailed by B. G. H. A.

(d) The gas shell allotted to divisions for other than counterbattery purposes will be sent up to four 4.5-inch howitzer battery positions per division (exclusive of the two 4.5-inch howitzer batteries of the Thirty-second Divisional Artillery).

(e) The smoke shell for 4.5-inch howitzers allotted to Sixteenth Divisional Artillery will be dumped at a 4.5-inch howitzer position to be ordered by C. R. A. Sixteenth Division.

(f) The smoke shell for 18-pounder will be sent up to forward 18-pounder positions of Thirty-second Divisional Artillery.

35. Tasks for forward guns.

Reference paragraph 18: Tasks allotted to the six 18-pounder batteries of Thirty-second Divisional Artillery from zero until zero plus 5 hours 30 minutes are as under—

(a) *Zero till zero plus 35 minutes (one battery F Group using smoke shell).*—Cover with smoke the front of WYTSCHAETE along the line OCCASION TRENCH—OBVIOUS DRIVE. Fall of shell to be arranged according to the direction and force of the wind.

Rate of fire, 4 rounds per gun per minute.

(b) *Zero till zero plus 3 hours 40 minutes (E Group, three batteries).*—Search and sweep between BLUE and BLACK Lines from L'ENFER FARM to OCCASION SWITCH. No fire to be west of GREEN Line after zero plus 1 hour 5 minutes.

26 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

(*F Group, three batteries*) (including 1 battery vide subparagraph (a))—

Search: (i) OBVIOUS ALLEY; (ii) OOSTAVERNE TRENCH; (iii)* OOSTAVERNE SUPPORT (after zero plus 35 minutes).

Average rate of fire, 2 rounds per gun per minute.

(c) *Zero plus 3 hours 40 minutes to zero plus 5 hours 30 minutes (E Group, three batteries).*—Search and sweep from 300 yards E. of BLACK LINE between Farm O 27 a 1.1 and the word COPSE O 20 b 8.3.

(*F Group, three batteries*)—

Search: (i) OOSTAVERNE SUPPORT; (ii) OOSTAVERNE WOOD; (iii) OIL TRENCH.

Fire to lift off OOSTAVERNE SUPPORT at zero plus 4 hours and no fire to be west of line O 15 c 9.4—LEG COPSE after zero plus 5 hours.

Average rate of fire—2 rounds per gun per minute.

(d) The tasks for these batteries after zero plus 5 hours 30 minutes will be allotted later.

(e) C. R. A. Thirty-sixth Division will issue orders in accordance with the above instructions.

36. Advance of heavy artillery.

The following heavy and siege batteries will be held in readiness to advance as soon as the OOSTAVERNE LINE is captured.

(a) *To positions in our own lines—*

Position to be occupied.

1 6-inch howitzer battery...N 22 b 80.65.	} Map A1.
1 6-inch howitzer battery...N 17 c 7.7.	
1 60-pounder battery.....N 22 b 80.15.	
1 60-pounder battery.....N 28 d 20.90.	

All arrangements will be made prior to Z-day to facilitate the rapid opening of fire when the batteries get into position.

Dumps of 300 rounds per gun will be made at the positions prior to Z-day.

(b) *To positions beyond "No Mans Land"—*

1 60-pounder battery.
2 6-inch howitzer batteries.

As soon as the BLACK LINE is captured, special officers will be sent forward to reconnoiter and select the positions.

(c) No movement of batteries will take place without reference to R. A. Ninth Corps.

37. Advance of additional heavy artillery.

Arrangements will also be thought out for the early forward movement of the following heavy artillery—additional to that mentioned in paragraph 70.

	Battery.
12-inch howitzer (road).....	1
9.2-inch howitzer.....	1
8-inch howitzer.....	1
6-inch howitzer.....	4

38. Synchronization of watches.

All previous instructions re synchronization of watches are canceled. Arrangements have been made for Sixteenth, Nineteenth, and Thirty-sixth Divisions and Ninth Corps Heavy Artillery to be able to take EIFFEL TOWER time at 12 noon daily.

They will be responsible for synchronization of watches in their command—which, in the case of divisions, will include divisional artillery groups.

Every formation in divisions and Ninth Corps Heavy Artillery will check watches daily after receipt of standard time with the formation immediately above it by telephone.

39. Captured guns.

(i) It has been decided that the policy to be observed in dealing with hostile guns west of the OOSTAVERNE LINE will be as follows:

Enemy guns which may be of use to us will be saved. The gun teams should be killed and the breech mechanism with any removable sight removed if necessary. Destruction by explosives is not to be resorted to unless it is evident that the OOSTAVERNE LINE can not be gained and held. In this case the officer on the spot must use his own judgment as to destroying the guns. Explosives for this purpose will be taken forward.

Breech blocks and sights removed from the guns will be retained near the guns by the parties who remain in charge of them until it becomes evident that no use can be made of the guns by us, in which case parts removed will be carried back to battalion headquarters or destroyed.

(ii) Divisional artillery groups and Ninth Corps Heavy Artillery will tell off detachments previous to Z-day, who will be held ready to go up and man the captured guns if required.

These detachments and the officers in charge should be selected, if possible, from personnel who have previous knowledge of enemy guns.

40. Counter-battery area.

The boundaries of the corps counter-battery area are shown in Appendix A 13. .

41. Bombardment.

(i) *Duration.*—The bombardment will commence on Z minus 5-day and will be carried out continuously for five days. These days will be known as U, V, W, X, and Y days.

(ii) *Object of the bombardment.*—The bombardment will be carried out not with the view of total destruction of the enemy's trench system but in order to destroy machine-gun emplacements, strong points, headquarters, and other selected points—by the destruction of which the enemy defensive system will be thoroughly disorganized. The further object of the bombardment, in addition to killing as many of the enemy as possible, is to thoroughly demoralize and starve out the troops holding the trenches. This will be accomplished by barraging continuously day and night the enemy communications and lines of approach and by shelling his billets and dumps.

(iii) *Objectives of the various natures.*—The destruction of sections of trenches and trench junctions will be carried out by 6-inch howitzers, assisted by 4.5-inch howitzers.

The heavy howitzers will deal with objectives beyond the power of the 6-inch howitzers.

The 12 and 15-inch bombardment howitzers will deal with WYRSCHAETE and specially strong points which are beyond the power of the heavy howitzers.

The front line and support line will be dealt with entirely by 18-pounders, 4.5-inch howitzers, and trench mortars. Heavy trench mortars will deal with selected points within their range.

(iv) *Wire cutting.*—Wire cutting by the divisional artillery and by siege howitzers with 106 fuzes will be carried out vigorously throughout the bombardment. Divisional artilleries will insure that all wire in their sector which has been cut is kept under fire throughout the night, and on days of low visibility, to prevent the possibility of repair. Machine guns will assist in this work, and close cooperation between the guns and the machine guns is necessary for the efficient carrying out of the task. Arrangements will be made for infantry officers to visit O.P.'s and watch the wire cutting in progress.

(v) *Counter-battery work.*—Destructive counter-battery work will be carried on vigorously throughout the bombardment. Batteries

which have been destroyed during the day will be subjected to intermittent bursts of fire throughout the night.

On days of low visibility, when air observation is impossible, short concentrated bombardments by several batteries will be carried out on the hostile batteries in turn.

The enemy gunners, as well as his infantry, must be given no rest by day or night.

(vi) *Special bombardments.*—Upon U and V days concentrated bombardments of MESSINES and WYTSCHAETE will be carried out under the orders of Second Anzac and Ninth Corps, respectively, by all siege howitzers, except counter batteries, which can bear upon these places.

Gas shell from 4.5-inch howitzers and smoke shell from 18-pounders will be employed after these concentrated bombardments to hamper the work of repair.

Orders for the bombardment of WYTSCHAETE are shown in Appendix A 8.

(vii) *Practice barrages.*—Practice barrages, preceded by a short intense bombardment, will be carried out on Z minus 6-day and V-day—in accordance with orders contained in Appendix A 9.

The exact time for these barrages, which will be notified later, will be fixed so as to induce the belief that the attack will be launched in the afternoon. Jumps back are included and also an overlap into adjoining corps, both to practice synchronization and to avoid disclosing boundaries.

Special artillery and infantry officers will be detailed by each division to watch the barrage and to report on—

- (a) The efficacy of our own barrages—special note to be made of any gaps or irregularities.
- (b) The time of starting, nature, intensity, duration, and locality, etc., of the enemy reply.

Reports to be forwarded to R. A. Ninth Corps as soon as possible after the completion of the practice.

It should be made quite clear to the infantry that the practice barrage and preceding bombardment does not in any way represent the volume and intensity of the fire which will be directed on the German trenches at zero hour on the day of attack.

Not more than 75 per cent of field guns and 50 per cent of heavy artillery allotted for support of each division will be used, and fire will be opened at only one-half the maximum rate.

30 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

(viii) *Pauses in the bombardment—*

For “*datuming*”:

U day.....	5.30 a. m. to 6 a. m.
V day.....	5.30 a. m. to 6 a. m.
W day.....	5 a. m. to 5.30 a. m.
X day.....	5.30 a. m. to 6 a. m.
Y day.....	5 a. m. to 5.30 a. m.

Wire cutting and bombardment will not commence till after these hours.

Barraging of communications and approaches east of the MESSINES Str. ELOR Road will continue until the active bombardment and wire cutting commences.

(ix) *Raids and patrols.*—To enable patrols to examine the enemy's wire and raids to be carried out, there will be no fire on the enemy's front line between the hours named below—

Night V/W.....	11 p. m. to 12 midnight.
Night W/X.....	10.30 p. m. to 11.30 p. m.
Night X/Y.....	12 midnight to 1 a. m.
Night Y/Z.....	11.30 p. m. to 12.30 a. m.

Arrangements for any artillery support required, in connection with raids or gas attacks, will be made by C. R. A.'s of divisions direct without reference to R. A. Ninth Corps.

Application will be made to B. G. H. A. direct for any heavy artillery assistance required.

(x) *Synchronization of watches.*—Watches will be synchronized at 12 noon daily from June 1 under arrangements to be made by the Signal Service.

(xi) *Heavy artillery officers.*—B. G. H. A. will arrange for special officers to visit the trenches in each sector every day during the bombardment to explain what the different natures of guns, including counter batteries, are doing, and to supply any information in their power that they may be asked for.

(xii) *Personnel.*—The bombardment will throw a very great strain on all artillery personnel, and it is only by a carefully thought-out system of reliefs that efficient service of the guns can be assured.

(xiii) *Ammunition*.—The average number of rounds per gun per day to be expended will be—

18-pounder (50 for night firing).....	150
4.5-inch howitzer (including gas shell).....	150
60-pounder.....	150
6-inch howitzer.....	150
8-inch howitzer.....	110
9.2-inch howitzer.....	110
12-inch howitzer.....	70
15-inch howitzer.....	25
6-inch Mk VII gun.....	100

(xiv) *Number of guns*.—Not more than 75 per cent of the guns of provisional artilleries or heavy artillery are to be firing at the same time before zero.

(xv) *Gas shell*.—In addition to being used against WYTSCHAETE gas shell will be used with 4.5-inch howitzers and 60-pounders against enemy communications, and with 4.5-inch howitzers in connection with the practice barrage.

(xvi) *Smoke shell*.—Will be used with 4.5-inch howitzers in connection with the practice barrages.

(xvii) *Duration of night*.—Night, unless otherwise stated, lasts from 8 p. m. to 5 a. m.

42. Barraging Communications.

(i) Night firing on communications will be divided into two phases—"A" and "B."

(a) *Phase A*.—(8.30 p. m. Z minus 7-day to 8.30 p. m. Z minus 5-day.) During this period the route from COMINES via cross roads O 28 d 8.8 and MILITARY Road to O 20 d 5.3 will be left open.

This road is colored blue on attached map A 3.

(b) *Phase B*.—(8.30 p. m. Z minus 5-day to zero hour on Z day.) During this period all lines of approach will be blocked.

(ii) Tasks for different natures are all colored on map A 3, as follows:

6-inch Mark VII.....	Blue.
60-pounder.....	Red.
4.5-inch howitzer.....	Green.
4.5-inch howitzer tasks are allotted to divisions as follows:	
Nineteenth Division.....	3, 4, and 9.
Sixteenth Division.....	2 and 5.
Thirty-sixth Division.....	1 and 6.

32 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

(iii) During phase A the following tasks will be carried out from 8.30 p. m. to 4.30 a. m.:

- 6-inch Mark VII.....21, 23, and 24.
- 60-pounder.....3, 7, 9, 10, 14, and 16.
- 4.5-inch howitzer.....1, 2, 3, 4, and 6.

Ammunition to be expended:

- 6-inch Mark VII, average of 6 rounds per task per hour.
- 60-pounder, average of 20 rounds per task per hour.
- 4.5-inch howitzer, 200 rounds per division per night.

(iv) *During phase B.*—All tasks as marked on the map will be carried out from 8.30 p. m. to 4.30 a. m.

Ammunition to be expended:

- 6-inch Mark VII, average of 10 rounds per task per hour.
- The majority of the fire being directed at HOUTHEM.
- 60-pounders, average of 35 rounds per task per hour.
- 4.5-inch howitzers, 50 rounds per gun per night.

Fire on road junctions will be carried out by bursts at irregular intervals; 60-pounders will also search and sweep.

(v) *Gas shell.*—The areas marked 1, 2, 3, and 4 on map will be bombarded with 4.5-inch howitzer gas shell on the nights U/V and V/W.

Bombardment will commence—

- U/V night at 10 p. m.
- V/W night at 1 a. m.

Areas allotted to divisions:

- Nineteenth Division.....3 and 4.
- Sixteenth Division.....2.
- Thirty-sixth Division.....1.

Programs will be made out by C. R. A.'s of divisions, after consultation with corps chemical adviser. If weather conditions are unfavorable and gas-shell bombardments are *NOT* to take place, orders will be issued by R. A. Ninth Corps at least two hours before the times mentioned above.

Message will take the form "Reference paragraph 42 conditions do *NOT* permit."

Divisions will each keep 300 rounds of lachrymatory shell available for use in connection with bombardment of WYTSCHAETE and the practice barrages.

Appendix A 10—"Notes on the use of lethal and lachrymatory shells"—is attached.

(vi) It is the intention during phase B to keep all possible lines of approach under fire during the hours of night and on days when the

weather is unsuitable for aeroplane observation. O. C. Fifty-third Squadron will please inform R. A. Ninth Corps immediately if for any reason the aeroplanes are unable to keep the enemy communications and routes of approach west of the CANAL under observation. On days of low visibility 60-pounders and 6-inch Mark VII night barrage batteries will be held in readiness to take up their barrage duties on receipt of orders from R. A. Ninth Corps.

The orders will be sent in the form of a message—"BARRAGE COMMUNICATIONS."

Ammunition to be expended will be one-half the number of rounds per task per hour ordered for night shooting. It must be specially arranged that there is no pause between the night shooting and the time that bombardment and wire cutting commences.

(vii) During both phases the night barraging of communications within the inner zone will be carried out under the orders of the C. R. A. of the division.

Ammunition to be expended:

Phase A, 30 rounds per 18-pounder per night.

Phase B, 50 rounds per 18-pounder per night.

(viii) During both phases the following objectives will be subjected to bursts of fire at intervals throughout the day:

6-inch Mark VII..... 21, 24.

60-pounders..... 15, 17, 18, 19.

Ammunition to be expended:

6-inch Mark VII, 7 rounds per task per hour.

60-pounders, 24 rounds per task per hour.

(ix) Night will be from 8.30 p. m. to 4.30 a. m.

43. Action on Z-day.

(i) *Action previous to assault.*—Previous to the assault there will be no intense bombardment—night firing and artillery work generally will be carried on as usual until zero hour.

It is essential that there should be no alteration in the rate or volume of fire previous to zero hour, and that everything should appear normal.

(ii) *Action at zero.*—At zero all guns will open at their maximum rate of fire and the infantry will leave their trenches and form up under the 18-pounders creeping barrage.

(iii) *Barrage arrangements.*—The barrages will consist of—

(a) A creeping barrage of 18-pounders shrapnel, moving in advance of the infantry, at average lifts of 100 yards.

(b) Standing barrages of 18-pounders, 4.5-inch howitzers, medium and heavy howitzers, which will be established on successive trenches, strong points, etc., within the limits of safety of each nature of gun and howitzer.

These barrages have been arranged in depth so as to insure that all ground, which commands the line of advance of our infantry, is kept under fire from zero onwards.

(iv) *Barrage maps.*—Map A 2 shows the times of lifts and pauses of the creeping barrage up to the BLACK LINE. The times of lifts must be strictly adhered to at the junctions of corps and divisions, but adjustments within the divisional boundaries may be made in order to deal with special objectives.

Map A 5 shows the medium and heavy howitzer standing barrage and its different lifts up to the BLACK LINE.

(v) *Protective barrages.*—During the periods of consolidation of the RED, BLUE, and GREEN LINES the creeping barrage will form a protective barrage 150 yards in front of our infantry. Fire will not be kept on the same points the whole time, but a system of searching and sweeping will be employed, so that all enemy movement in the area will be stopped.

(vi) *Protective barrage in front of the Black Line.*—The protective barrage in front of the BLACK LINE will be placed 300 yards in front of our infantry.

At zero plus 5 hours 30 minutes the 18-pounders and 4.5-inch howitzers will stop firing and will not reopen except in case of an S. O. S. call.

(vii) *Formation of the barrage.*—In forming the 18-pounder creeping and protective barrages arrangements should be made to superimpose the fire of one 18-pounder battery on the front allotted to two other 18-pounder batteries of the group, so as to allow the ready removal of the former battery, to meet any unforeseen contingency that may arise, without affecting the general distribution of the barrage.

(viii) *S. O. S.*—In case of an S. O. S. call fire will last for half an hour, then stop and wait for another call. The heavy artillery will be prepared to form a barrage outside that of the field guns, special attention being paid to lines of approach and places of assembly.

(ix) *Rebombardment.*—In case of a rebombardment of any locality being ordered the bombardment will last for half an hour, the last five minutes to be intense.

A zero hour, at which the bombardment will commence, will be fixed by Ninth Corps.

(x) *Guns of opportunity.*—No guns, other than “guns of opportunity” (vide par. 26) may be taken out of the barrage without reference to the corps.

(xi) *Rates of fire.*—Rates of fire will vary according to local conditions. The following are given as a guide:

During the time our infantry are advancing: 3 rounds per 18-pounder per minute; 2 rounds per 4.5-inch howitzer per minute.

During periods of consolidation: 1 round per 18-pounder per minute; 1 round per 4.5-inch howitzer per minute.

Rates of fire for the heavy artillery will be as laid down by the B. G. H. A.

(xii) *Further advance to Oostaverne Line.*—Orders for the subsequent action of the artillery during the advance from the BLACK LINE to the OOSTAVERNE LINE will be issued later.

44. Bombardment.

The five days' intense bombardment will start to-day (May 31).

During this period the normal counter-battery groups will devote their attention to destructive shoots. Neutralization will be reduced to the lowest possible limits.

45. Counter-battery work.

The two days following the five days of bombardment will be primarily devoted to intense counter-battery work. Every available howitzer that can be spared from bombardment groups will be used for intense and destructive counter-battery work and programs will be arranged so as to obtain the maximum value from aeroplane and balloon observation.

46. Gas shell.

Gas shell will be used on enemy batteries during the three or four nights before the assault in sufficient quantity to ensure the detachments being forced to put on their masks and so kept awake and exhausted. Counter battery staff officer will arrange the necessary program after consultation with the corps chemical adviser.

47. 4.5-inch howitzers for counter-battery work.

Reference paragraph 17 the 4.5-inch howitzer battery per division, detailed for counter-battery work after zero, will be held available for counter-battery work prior to zero, if required. C. B. staff officer will notify divisional artilleries as early as possible when he requires the use of the batteries.

36 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

48. Barraging communications.

Barraging communications (phase A) will commence at 8.30 p. m. today (May 31) and will be carried out according to instructions given in paragraph 42 Ninth Corps Instructions for the Offensive, Part II, artillery.

49. Ammunition.

The daily average ammunition expenditure, per gun per 24 hours for total number of guns, will be—

May 31 and June 1.—18-pounder and 4.5-inch howitzer, 100 rounds; siege howitzers, in accordance with paragraph 41 subparagraph (xiii); 60-pounders and 6-inch Mark VII, in accordance with tasks allotted.

June 2 to June 6.—All natures, in accordance with paragraph 41, subparagraph (xiii).

50. Gas shell.

An additional allotment of gas shell is made to divisions as under:
4.5-inch howitzer C. B. R.:

<i>Sixteenth Divisional Artillery</i>	700
<i>Nineteenth Divisional Artillery</i>	700
<i>Thirty-sixth Divisional Artillery</i>	700

This ammunition will be used on Y/Z night.

Objectives for each division will be as allotted in paragraph 42 subparagraph (v).

Programs for bombardment will be made out by C. R. A.'s of divisions after consultation with corps chemical adviser.

Zero hour will be 1 a. m.

51. Gas-shell bombardments.

If weather conditions are unfavorable for gas-shell bombardments, and likely to continue so, the order canceling the bombardment will be sent out in the form—"Reference paragraph—conditions do NOT permit."

If at the time the order to cancel is sent out, there is a likelihood of the conditions becoming favorable later, the message will take the form—"Reference paragraph—conditions do NOT permit. Stand-by."

Batteries will then be ordered to stand-by and be ready to open fire at an hour's notice.

If the bombardment is eventually to take place the order will then be sent in the form—"Reference paragraph—conditions NOW permit. Zero hour will be——"

53. 4.5-inch howitzers for counter-battery work.

At zero plus 5 hours 30 minutes after the capture of the BLACK LINE all counter-battery 4.5-inch howitzer batteries will cease to do counter-battery work and will come under the orders of the divisional artillery group concerned.

53. S. O. S. call from aeroplane.

If the hostile infantry are seen to leave their trenches and advance, the observer will send down, by wireless, S. O. S. followed by the zone call—no map coordinates will be sent. The artillery, covering our infantry in the zone sent down, will immediately put up a barrage on their S. O. S. lines.

Fire to be maintained for half an hour and then wait for another call.

54. Army demonstration.

On June 3 a practice barrage demonstration will be carried out on the whole front of the Second Army. Instructions are contained in Appendix A 11 attached.

55. Further advance to Oostaverne Line.

A. *New zero hour.*—The army commander has decided that there will be a new zero hour for the advance from the MAUVE LINE to the OOSTAVERNE LINE.

On Map A 6, which is forwarded herewith,

(i) The times of lifts with reference to the original zero hour are shown in BLACK.

(ii) The times of lifts with reference to the new zero hour are shown in GREEN.

N. B.—Fire will lift off the protective barrage in front of the BLACK LINE at zero plus 320 minutes and *not* at zero plus 330 minutes as shown on Second Army barrage map (map A 2 of these instructions). The map should be amended accordingly.

B. *Action of the divisional artillery groups.*—(i) The Sixteenth, Nineteenth, and Thirty-sixth Divisional Artillery Groups will support the infantry advance on to the MAUVE LINE and thence on to the OOSTAVERNE LINE. The zone of each divisional artillery group and the lifts of the creeping barrage are shown on Map A 6.

Within the corps boundaries each divisional artillery group will arrange for an overlap on the flanks of 100 yards.

(ii) The *creeping barrage* will be formed of 18-pounders at 1 gun per 20 yards.

38 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

(iii) The *standing barrage* will be formed of one 18-pounder or 4.5-inch howitzer per 20 yards—at least three 4.5-inch howitzer batteries per division to be included.

If sufficient 18-pounders are not available to shoot at an effective range, their place in the standing barrage will be taken by 4.5-inch howitzers.

The standing barrage will search deeply from 300 yards in front of the creeping barrage and will pay special attention to any strong points or trenches in its passage.

(iv) *Consolidation*.—During periods of consolidation, the guns of the standing barrage will cease fire except for S. O. S.

The guns of the creeping barrage will form a protective barrage 300 yards in front of the infantry—keeping up a slow rate of fire on any places likely to hold the enemy, and searching deeply.

Periods of consolidation are—(a) Zero plus 354 minutes to zero plus 390 minutes; (b) New zero plus 38 minutes to new zero plus 65 minutes.

(v) *Stop firing*.—At new zero plus 65 minutes all guns will stop fire, and will not reopen except for S. O. S.

(vi) *Forward guns*.—From zero plus 330 minutes to new zero plus 65 minutes, the fire of the 18-pounder batteries of Thirty-second Divisional Artillery will be spread out so as to cover the fronts allotted to Sixteenth and Thirty-sixteenth Divisional Artillery Groups. These batteries will follow the lifts and conform to the orders for the creeping barrage. C. R. A. Thirty-sixth Division will issue the necessary orders and make the necessary arrangements for liaison with the infantry.

(vii) *Ranges*.—18-pounders will stop fire at a range of 6,200 yards; 4.5-inch howitzers will stop fire at a range of 7,000 yards.

C. *Action of heavy artillery*.—(i) *Zero plus 330 minutes to new zero minus 30 minutes*.—(a) A steady, and, if possible, observed bombardment of OOSTAVERNE Trench and support line will be carried out, with the object of cutting wire and preparing the position for assault.

The preparation will require the expenditure of about 8,000 howitzer shell and special batteries will be told off for the purpose.

(b) Selected objectives west of the OOSTAVERNE LINE will be kept under fire, special attention being paid to—

Oil Trench.

Oostaverne Village.

Battery positions.

The various farms.

Objectives to be allotted and subsequent lifts, as our infantry advance, to be arranged according to the limits of safety of the different natures.

(ii) *New zero minus 30 minutes to new zero.*—Intense bombardment of OOSTAVERNE Trench and support.

(iii) *New zero to new zero plus 50 minutes.*—Fire will lift off OOSTAVERNE LINE at new zero and move forward 800 yards by lifts of 200 yards every 5 minutes. Slow rate of fire to be maintained.

At new zero plus 50 minutes all guns will stop firing and will not reopen except for S. O. S.

(iv) *S. O. S.*—In case of S. O. S., the heavy artillery will form a barrage outside the field-gun barrage, but no fire will be directed at objectives within 500 yards of our infantry.

Special attention should be paid to enemy lines of approach and possible forming-up places.

D. *Zone calls.*—Orders given above, re guns not reopening fire except for S. O. S., do not affect guns detailed to answer zone calls.

56. Artillery defense of the Oostaverne Line.

(i) As soon as possible after new zero plus 65 minutes C. R. A. Sixteenth Division will make arrangements to cover the OOSTAVERNE LINE with the following guns:

(a) *Field artillery.*—Forward batteries of Sixteenth and Nineteenth Divisional Artillery Groups consisting of 4 F. A. brigades Sixteenth Divisional Artillery Group; 4 F. A. brigades Nineteenth Divisional Artillery Group.

(b) *Heavy artillery.*—Kemmel Group. The 60-pounders of this group will be reinforced up to three 60-pounder batteries.

(ii) The above artillery will be known as the "OOSTAVERNE Artillery."

(iii) C. R. A. Sixteenth Division will report to R. A. Ninth Corps as soon as he considers his arrangements for taking over command of the OOSTAVERNE Artillery are complete enough.

Instructions will then be issued by Ninth Corps for C. R. A. Sixteenth Division to take over command and assume responsibility for the artillery defense of the OOSTAVERNE front.

Until such time G. O. C. R. A. Ninth Corps will be responsible.

(iv) (a) During Z/A night—from 9 p. m. to 4 a. m.—the B. G. H. A. will detail batteries to carry out continuous night firing as follows:

Four 6-inch howitzer batteries.

Two 60-pounder batteries.

40 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

(b) The fire of the 6-inch howitzers will be distributed along German firing trench and support line between—

O 18 d 2.4 and O 30 b 0.0.

The 60-pounders will search and sweep the area east of Ninth Corps front on the OOSTAVERNE LINE, within the limits of north and south lines through O 23 central and O 24 central.

Special attention to be paid to roads and tracks through the wire.

(c) *Ammunition*.—60-pounder and 6-inch howitzer—20 rounds per gun per hour.

(d) Tasks and ammunition for 6-inch Mark VII guns will be as laid down in paragraph 42, subparagraph (iv).

57. Counter-battery work on Z-day.

On Z-day the counter-battery guns will be reinforced by the following heavy howitzers of bombardment groups:

(a) *From zero onward*.—Four 9.2-inch howitzer batteries.

(b) *Zero to zero plus 35 minutes*.—Two 15-inch howitzers; three 12-inch howitzers; three 9.2-inch howitzer batteries.¹

At zero plus 35 minutes these howitzers will return to bombardment work.

58. Counter-battery work on Y/Z night.

It is imperative that the enemy's artillery fire be kept down on Y/Z night when our infantry are moving up to their positions of assembly.

Any enemy battery that opens fire must be neutralized at once.

In the event of the enemy opening a general bombardment, neutralization must be carried out by the whole of the counter-battery howitzers and guns.

59. Distant barrage guns.

From zero to zero plus one hour.—(i) On Z-day the following distant barrage guns will be used for counter-battery work:

Four 6-inch Mark VII guns.

Two 60-pounder batteries.

(ii) After zero plus one hour these guns will carry out their day barrage tasks—as laid down in paragraph 42, subparagraph (viii).

Ammunition.—6-inch Mark VII, 10 rounds per gun per hour; 60-pounder, 30 rounds per gun per hour.

¹Additional to batteries under (a) above.

60. Second army demonstration.

There will be an army demonstration on June 5, starting at 3 p. m. and lasting for 10 minutes. It will not be preceded by a bombardment. Instructions are contained in Appendix A 12.

61. S. O. S. on Oostaverne Line.

In case of S. O. S. (i) The field artillery barrage in front of the OOSTAVERNE LINE, which will be put down on the protective barrage line (38-65) shown on map A 6, will be formed by the following guns:

Thirty-sixth Divisional Artillery Group.—Three F. A. brigades (including one brigade Thirty-second Divisional Artillery).

Sixteenth Divisional Artillery Group.—Three F. A. brigades (including one brigade Thirty-second Divisional Artillery).

Nineteenth Divisional Artillery Group.—Three F. A. brigades.

(ii) The frontages to be covered by Divisional Artillery Groups are as shown on barrage map A 6.

(iii) The howitzers of the KEMMEL Group will put down a barrage outside the field-gun barrage—but no fire will be directed at objectives within 500 yards of our infantry. Special attention being paid to possible forming-up places.

(iv) The 60-pounder batteries detailed for night firing on Z/A night, vide paragraph 56, subparagraph (iv), will search possible lines of approach—special attention to be paid to the WAMBEKE Valley. No fire to be west of a N. and S. line through O 23 central.

62. S. O. S. on Black Line.

In case of no further advance beyond the BLACK LINE C. R. As of divisions will arrange for the necessary protection of their own fronts with a sufficient number of field guns and howitzers—and heavy artillery assistance required being arranged for by C. R. As with their affiliated heavy artillery groups direct.

63. Further advance to Oostaverne Line.

In continuation of paragraph 55.

From new zero minus 30 minutes to new zero plus 50 minutes the B. G. H. A. will arrange for heavy or medium howitzer and 60-pounder fire to be directed to high ground and trenches in O 24 c and O 30 a—from where long-range machine-gun fire might hold up our advance.

A. W. FOOTE,

Major R. A., Staff Officer R. A. Ninth Corps.

JUNE 6, 1917.

APPENDIX A 1.

GUNS ALLOTTED TO NINTH CORPS.

HEAVY ARTILLERY.

15-inch howitzers.....	2
12-inch howitzers.....	6
9.2-inch howitzers.....	36
8-inch howitzers.....	32
6-inch howitzers.....	96
6-inch Mark VII guns.....	8
60-pounders.....	66

FIELD ARTILLERY.

18-pounders.....	360
4.5-inch howitzers ¹	112
9.45-inch heavy trench mortars ²	28
2-inch trench mortars.....	72

¹ One army field artillery brigade allotted has no howitzer battery; one army field artillery brigade allotted has a 4-gun howitzer battery.

² Including 4 long-range 9.45-inch trench mortars.

APPENDIX A 2.

RÔLES OF HEAVY ARTILLERY.

BOMBARDMENT.

15-inch howitzers.....	2
12-inch howitzers.....	3
9.2-inch howitzers.....	28
8-inch howitzers.....	24
6-inch howitzers.....	60

COUNTER BATTERY.

12-inch howitzers.....	3
9.2-inch howitzers.....	8
8-inch howitzers.....	8
6-inch howitzers.....	36
60-pounders ¹	54
6-inch Mark VII guns.....	4

DISTANT BARRAGE.

60-pounders.....	12
6-inch Mark VII guns.....	4

¹ Eighteen 60-pounders are grouped with bombardment groups and will be used from zero onward to support the infantry attack.

APPENDIX A 3.

Magnum opus—Ninth Corps Field Artillery positions.

[Reference sheet 28. Right Division (36th). 108 18-pounders; 36 4.5-inch howitzers.]

NUMBERS ALLOTTED, K 1 TO K 40.

(See Map A 1.)

	No. of position.	Nature.	Location.
Right group headquarters with infantry brigade:			
	K 1...	18-pounder....	N 34 c 95.75.
	K 28...	do.....	N 34 c 90.85.
A group; headquarters, dugouts; N 33 d 2.2.	K 3...	do.....	N 33 d 45.58.
	K 4...	do.....	N 33 d 10.90.
	K 19...	4.5-inch howitzer.	N 33 c 20.90.
	K 21...	do.....	N 33 a 20.20.
	K 2...	18-pounder....	N 34 a 7.0.
	K 32...	do.....	N 34 a 6.3.
B group; headquarters, dugouts; N 26 c 80.75.	K 5...	do.....	N 33 a 8.1.
	K 6...	do.....	N 33 a 7.3.
	K 8...	do.....	N 33 a 8.8.
	K 23...	4.5-inch howitzer.	N 27 a 1.3.
Left group; headquarters with infantry brigade:			
	K 9...	18-pounder....	N 27 c 8.0.
	K 12...	do.....	N 27 c 5.5.
C group; headquarters, dugouts; N 26 b 5.1.	K 13...	do.....	N 27 c 3.7.
	K 31...	do.....	N 28 a 1.4.
	K 24...	4.5-inch howitzer.	N 27 a 3.6.
	K 29...	do.....	N 27 a 4.8.
	K 14...	18-pounder....	N 21 d 35.14.
	K 15...	do.....	N 21 d 85.90.
D group; headquarters, dugouts; N 20 d 2.5.	K 16...	do.....	N 21 a 90.65.
	K 17...	do.....	N 21 b 10.80.
	K 18...	do.....	N 15 d 20.20.
	K 30...	4.5-inch howitzer.	N 28 a 21.58.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 45

Magnum opus—Ninth Corps Field Artillery positions—Continued.

[Reference sheet 28. Right Division (36th). 36 18-pounders; 12 4.5-inch howitzers.]

ATTACHED BATTERIES THIRTY-SECOND DIVISIONAL ARTILLERY.

(Vide pars. 18 and 35.)

	No. of position.	Nature.	Location.
E group: headquarters, N 34 a 75.60.	F K 1.	18-pounder....	N 35 a 80.10.
	F K 2.	.....do.....	N 35 a 50.20.
	F K 3.	.....do.....	N 35 a 30.40.
	F K 4.	4.5-inch howitzers.	N 35 a 20.50.
F group: headquarters, N 34 a 75.60.	F K 10.	18-pounder....	N 29 c 10.50.
	F K 11.	.....do.....	N 29 c 20.70.
	F K 12.	.....do.....	N 28 d 80.80.
	F K 9.	4.5-inch howitzers.	N 29 c 45.55.

[Reference sheet 28. Center Division (16th). 108 18-pounders; 36 4.5-inch howitzers.]

NUMBERS ALLOTTED K 41 TO K 80.

(See map A1.)

No. 1 (right) group; headquarters N 22 a 70.80, Rossignal wood (with Right Infantry Brigade headquarters).	K 41..	18-pounder....	N 15 d 40.15.
	K 42.	.....do.....	N 15 d 5.7.
	K 48.	.....do.....	N 16 a 1.2.
	K 49.	.....do.....	N 16 a 4.3.
	K 56.	.....do.....	N 15 b 25.80.
	K 67.	.....do.....	N 9 d 20.32.
	K 69.	.....do.....	N 16 a 1.7.
	K 47.	.....do.....	N 16 d 62.88.
	K 66.	.....do.....	N 16 c 9.0.
No. 3 (right) subgroup; headquarters N 16 c 3.9; Siege farm.	K 44..	4.5-inch howitzer.	N 16 c 1.7.
	K 59.	.....do.....	N 21 a 7.4.
	K 70.	.....do.....	N 16 b 40.55.
	K 50..	18-pounder....	N 16 a 5.6.
No. 2 (left) group; headquarters N 16 d 35.50; the rlb (with Left Infantry Brigade headquarters).	K 51.	.....do.....	N 16 a 4.8.
	K 52.	.....do.....	N 10 c 8.0.
	K 53.	.....do.....	N 15 b 9.6.
	K 57.	.....do.....	N 9 d 0.0.
	K 58.	.....do.....	N 9 d 48.92.
	K 65.	.....do.....	N 9 b 4.6.
	K 46.	.....do.....	N 16 d 50.70.
No. 4 (left) subgroup; headquarters N 16 c 2.9.	K 68.	.....do.....	N 10 d 20.15.
	K 62..	4.5-inch howitzer.	N 10 d 45.25.
	K 64.	.....do.....	N 10 a 0.7.
	K 71.	.....do.....	N 9 b 3.2.

46 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Magnum opus—Ninth Corps Field Artillery positions—Continued.

[Reference sheet 28, Left Division (19th). 108 18-pounders; 36 4.5-inch howitzers.]

NUMBERS ALLOTTED K 81 TO K 120.

(See map A1.)

	No. of position.	Nature.	Location.
Right group headquarters farm N 2 b 7.0:			
	K 105.	18-pounder....	N 10 c 37.90.
	K 94.	.....do.....	N 10 a 55.07.
	K 106.	.....do.....	N 10 a 70.25.
A subgroup; headquarters Cabarot, N 10 a 4.5.	K 85.	.....do.....	N 10 a 95.60.
	K 81.	4.5-inch howitzer.	N 10 c 70.25.
	K 82.	.....do.....	N 10 a 20.17.
	K 86.	18-pounder....	N 4 c 55.10.
	K 87.	.....do.....	N 4 c 65.32.
B subgroup; headquarters Cabarot, N 10 a 4.5.	K 88.	.....do.....	N 4 c 77.50.
	K 117.	.....do.....	N 4 d 41.58.
	K 107.	.....do.....	N 11 a 10.97.
	K 101.	4.5-inch howitzer.	N 4 c 10.75.
Left group headquarters farm N 3 b 40.25:			
	K 94.	18-pounder....	N 4 d 05.90.
	K 95.	.....do.....	N 4 b 40.20.
	K 109.	.....do.....	N 5 c 42.27.
C subgroup; headquarters farm N 4 a 1.8.	K 116.	.....do.....	N 5 c 03.77.
	K 118.	.....do.....	N 4 b 17.05.
	K 102.	4.5-inch howitzer.	N 4 c 95.75.
	K 96.	18-pounder....	N 4 b 47.47.
	K 111.	.....do.....	N 4 b 60.60.
	K 115.	.....do.....	N 5 a 10.00.
D subgroup; headquarters farm N 5 a 20.75.	K 119.	.....do.....	N 5 d 30.90.
	K 113.	4.5-inch howitzer.	N 4 b 95.95.
	K 114.	.....do.....	N 5 a 22.60.

APPENDIX A 4.

Magnum Opus—Nineteenth Corps Heavy Artillery Positions.

[Reference sheet 28.]

COUNTER BATTERY GROUPS.

(See map A1.)

	No. of position.	Nature.	Number of guns.	Location.
Forward group, headquarters N 20 d 70.25.....	K H 35..	6-inch howitzer	4	N 21 c 75.15.
	K H 54..	.....do.....	4	N 28 d 90.15.
	K H 55..	.....do.....	4	N 28 d 6.1.
	K H 59..	.....do.....	4	N 22 a 55.75.
	K H 62..	60-pounder....	6	N 26 d 7.2.
	K H 5... 12-inch howitzer (road).		1	N 1 b 30.05.
A group; headquarters N 13 a 2.0.	K H 6... ..do.....		1	N 19 d 95.50.
	K H 3... 12-inch howitzer (railway).		1	N 19 a 50.67.
	K H 32.. 6-inch howitzer		4	N 20 a 8.8; N 20 a 3.7.
	K H 47.. 60-pounder....		6	N 13 b 65.30.
	K H 48.. ..do.....		6	N 19 c 95.85; N 19 d 08.60;
				N 19 b 5.1.
B group; headquarters M 35 d 90.72.	K H 16.. 9.2-inch howitzer.		4	N 31 d 95.80.
	K H 20.. 8-inch howitzer		4	N 32 d 1.5; N 32 d 2.4.
	K H 27.. 6-inch howitzer		4	N 33 a 3.6.
	K H 29.. ..do.....		4	N 33 a 2.3.
	K H 45.. 60-pounder....		6	N 32 c 20.43; N 32 c 6.6.
	K H 46.. ..do.....		6	N 32 c 27.85; N 32 b 73.23.
C group; headquarters M 23 b 8.8.	K H 17.. 9.2-inch howitzer.		4	N 19 d 9.2.
	K H 53.. 8-inch howitzer		4	N 21 a 7.2.
	K H 7... 6-inch Mark VII.		1	M 24 b 55.20.
	K H 8... ..do.....		1	M 24 d 55.75.
	K H 9... ..do.....		1	M 24 d 10.04.
	K H 10.. ..do.....		1	M 30 d 15.65.
	K H 33.. 6-inch howitzer		4	N 21 b 05.01.
	K H 38.. ..do.....		4	N 21 c 5.9.
	K H 50.. 60-pounder....		6	N 14 b 3.1.

Reserve group—headquarters M 23 c 5.4.

48 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Magnum Opus—Nineteenth Corps Heavy Artillery Positions—Contd.

BOMBARDMENT GROUPS.

(See map A1.)

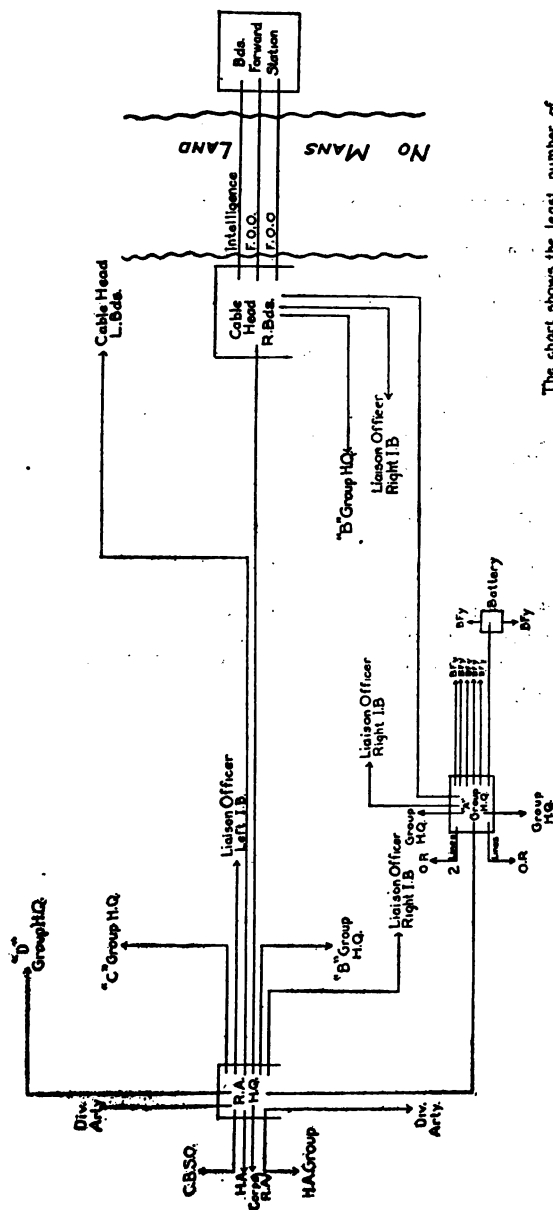
	No. of position.	Nature.	Number of guns.	Location.
Superheavy group; headquarters M 30 d 1.2.	K H 1...	15-inch howitzer.	1	N 13 a 80.55.
	K H 2...	do.	1	N 19 c 65.15.
	K H 64...	12-inch howitzer (railway).	1	N 13 d 50.75.
	K H 65...	do.	1	N 13 b 55.35.
	K H 4...	do.	1	N 19 a 85.85.
	K H 11...	9.2-inch howitzer.	2	N 19 d 8.7.
	K H 63...	do.	2	N 31 b 6.1.
	K H 18...	8-inch howitzer	4	N 19 a 80.70; N 19 a 55.80.
	K H 23...	do.	4	N 19 c 55.55.
	K H 14...	9.2-inch howitzer.	4	N 20 a 50.45; N 20 c 9.8.
La Clytte group; headquarters N 13 a 1.6.	K H 58...	do.	4	N 20 c 9.6.
	K H 22...	8-inch howitzer	4	N 14 b 8.6.
	K H 30...	6-inch howitzer	4	N 14 c 9.9.
	K H 31...	do.	4	N 1 d 1.6.
	K H 36...	do.	4	N 14 a 2.6; N 14 a 30.25.
	K H 42...	do.	4	N 20 a 55.80.
	K H 40...	60-pounder.	6	N 14 d 2.5.
	K H 24...	8-inch howitzer	4	N 14 b 15.65; N 14 a 90.45.
Hallebast group; headquarters N 8 b 4.5.	K H 25...	6-inch howitzer	4	N 3 a 5.6.
	K H 26...	do.	4	H 27 d 40.65.
	K H 43 ¹ .	60-pounder.	6	N 3 a 50.25; N 3 d 85.50 to 65.35
	K. H 44 ¹	do.	6	N 14 d 1.8.
	K H 12...	9.2-inch howitzer.	4	N 22 a 20.95.
Kemmel group; headquarters N 20 d 2.5.	K H 15...	do.	4	N 21 b 60.70 to 85.85.
	K H 21...	8-inch howitzer	4	N 20 c 8.9.
	K H 39...	6-inch howitzer	4	N 25 b 50.45.
	K H 41...	do.	4	N 25 a 95.70; N 25 a 83.90.
	K H 67...	do.	4	N 19 d 65.75.
	K H 37...	do.	4	N 25 b 15.10.
	K H 56...	60-pounder.	6	N 20 a 15.00.
	K H 52 ¹ .	6-inch Mark VII.	2	M 36 b 50.65.
	K H 13...	9.2-inch howitzer.	4	M 30 b 20.85.
Hospice group; headquarters M 29 b 77.95.	K H 60...	do.	4	N 32 a 6.2.
	K H 19...	8-inch howitzer	4	M 30 b 3.3.
	K H 28...	6-inch howitzer	4	N 32 b 40.45.
	K H 34...	do.	4	N 20 a 6.2.
	K H 40...	do.	4	N 32 d 2.2.
	K H 61...	do.	4	N 19 b 05.95.
	K H 67...	do.	4	M 24 d 3.4.
	K H 66...	60-pounder.	6	T 1 a 05.95.
	K H 51 ¹ .	6-inch Mark VII.	2	N 32 b 75.75.

Attached barrage batteries.

SUGGESTED DIVISIONAL ARTILLERY COMMUNICATIONS

Appendix A4

Showing R.A.H.Q. and 'A' Group Complete



The chart shows the least number of

Lines considered: necessary

1 X. Corps, Type: Section 1B:6:17.

9. C. T. M. 20.

APPENDIX A 5.

ALLOTMENT OF BATTLE O. P.'s TO R. A. NINTH CORPS.

Sixteenth division.—N 10, N 11, N 15, N 25, N 26 a, N 26, K 4, K 16, K 17, L K 2, and L K 4.

Nineteenth division.—N 17, N 18, N 20, N 24, N 27, N 30, N 33, N 34, O 2, and P 1.

Thirty-sixth division.—K 14, F 4, F 2, K 15, F 6, K 18, K 19, K S 1, K S 8, and T 14 a (T 18 b 95.50).

Ninth Corps Heavy Artillery.—N 6, N 16, N 21, N 22, N 23, N 28, N 29, K 1, K 2, K 3, K 7, K 9, K 10, K 12, K 13, K 23 (N 26 b 15.66), K S 2, K S 5, L K 3, T 5 (T 18 b 58.64), and T 14 (T 18 b 92.41).

All O. P.'s will be taken over in accordance with the above allotment by May 22.

O. P.'s IN NINTH CORPS AREA ALLOTTED TO OTHER CORPS.

Tenth Corps.—O 1, N 35, K 5, and tree in front of RIDGE WOOD.

Second Anzac Corps.—K 8, K S 4, K S 7, and K S 9.

Any of the above O. P.'s occupied by Ninth Corps will be vacated by May 22.

APPENDIX A 6.

COOPERATION WITH ROYAL FLYING CORPS.

AEROPLANES.

A. *Prior to zero.*—(1) Fifty-third Squadron will aim at always keeping three planes in the air during the hours of daylight for artillery work. Normally two planes will be employed on counter-battery work—the other plane carrying out observation of trench bombardments, wire cutting, and registration, with the heavy artillery. In addition one plane will be available each day for work with the divisional artillery.

(2) The flash reconnaissance machine will signal N. F. targets and, if possible, send “mostly” corrections but will not carry out deliberate shoots.

(3) During the bombardment the whole of the trench area within the flank limits of Ninth Corps objectives will be photographed once a day.

There will be no special pauses in the bombardment for photography.

Fifty-third Squadron hope to deliver proof copies to Ninth Corps heavy artillery one hour after the photography machine lands—and to divisions concerned and Ninth Corps headquarters a few minutes later.

Route to be followed by despatch rider.—Aerodrome: Ninth Corps heavy artillery—SCHERPENBERG (sixteenth, nineteenth, and thirty-sixth divisions)—Ninth Corps headquarters.

(4) Photographs of hostile battery positions will be taken as soon as possible after the completion of a destructive shoot and copies will be sent to the counter-battery office.

(5) Every evening the counter-battery staff officer will issue a program of destructive shoots for the next day—the battery carrying out each shoot, and the group to which it belongs will be shown.

Fifty-third Squadron will arrange that, as far as possible, each flight always works with the same groups and the pilot and observer with the same battery.

52 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

On the program a target number will be given to each hostile battery and the observer will use this number to designate the target when calling up from the air.

B. *After zero.*—(1) During active operations all counter-battery guns and howitzers will be used for neutralization with either gas shells, H. E., or shrapnel. Certain of these batteries will be told off to answer N. F. and G. F. calls and others to reply to M. Q. N. F. calls. M. Q. N. F. calls will never be sent unless the neutralizing fire on a hostile battery is seen to be ineffective. Normally 6-inch howitzers and 60-pounders will be detailed to take N. F. and G. F. calls and the heavier howitzers M. Q. N. F. calls.

(2) Fifty-third Squadron will arrange that two machines (flash spotting) will work, one north of WAMBEKE River, and one south of this river. Batteries will be detailed, as stated in paragraph 1 above, to answer either N. F. and G. F. or M. Q. N. F. calls in one of these areas.

BALLOONS.

C. *Before zero.*—(1) The two balloons of No. 5 Company will be connected by telephone lines, available for observation purposes, to all the heavy artillery groups of Ninth Corps except the SUPERHEAVY, HALLEBAST, and FORWARD groups. Communication to these latter groups can be obtained through one exchange, but normally the line cannot remain plugged through for observation purposes for any length of time. The balloons will also be connected to the counter-battery office by a direct line and to divisional artilleries.

(2) The balloons will be used for observation of fire in trench bombardments and to carry out registration and destructive counter-battery shoots. It is very important that every possible use should be made of balloon observation so as to relieve the aeroplanes.

In this connection copies of a visibility map have been issued to Ninth Corps Heavy Artillery, counter-battery staff officer, and divisional artilleries, showing points and hostile battery positions on the Ninth Corps front and up to a distance of 3,000 yards beyond the MESSINES-WYTSCHAETE Ridge, which are visible from the corps balloons on a day of *fair* visibility.

The balloons are prepared to observe fire on any of the points marked. Naturally numberless other points are visible from the balloon but what are considered the most important ones have been marked. It should be noted that the edges of woods are clearly defined to view from the balloon.

If batteries desire to be ranged on any particular points, other than those marked on the map, the balloon should be asked whether it is able to observe the fire.

(3) Zone calls will be reported by the balloon direct to the heavy artillery group covering the zone in which the target is located. Zone calls from the balloon will be engaged in the same manner as laid down for zone calls from aeroplanes.

(4) When answering a zone call sent by aeroplane, or carrying out a neutralizing shoot, batteries will ask the balloon to assist with observation on the fall of the rounds. In this connection No. 5 Balloon Company are arranging for balloons to fly a signal to indicate when they are available to carry out observation. This will insure that batteries do not call up the balloon when the latter is already fully engaged. This signal will take the form of a black pennant 15 feet long.

D. *After zero*.—During active operations the duties of the balloons will consist in carrying out general observations—special attention being paid to roads, approaches, and possible forming-up places in the enemy's country. Any information will be communicated at once to the counter-battery office and any division of the corps which is likely to be affected.

The counter-battery S. O. will pass on the information immediately to R. A. Ninth Corps and Ninth Corps heavy artillery. Hostile guns seen active will be reported by the balloon to the counter-battery office direct.

GROUND STATIONS.

E. (i) Ground stations will be established at headquarters Ninth Corps heavy artillery, counter-battery office, headquarters heavy artillery groups, headquarters field artillery groups, all heavy and siege batteries and 4.5-inch howitzer batteries detailed for counter-battery work.

(ii) When field batteries move forward to positions in "NO-MANS-LAND" or beyond, wireless masts will be given to selected batteries detailed to answer zone calls.

ZONE CALL AREAS.

F. (1) Ninth Corps zone call areas will be bounded—

(a) *On the north between Ninth and Tenth Corps*.—By a line from O 8 a 00.80 to O 8 d 60.00 and thence along northern boundary of the counter-battery area.

(b) *On the south between Ninth Corps and Second Anzac Corps*.—By a line from N 36 b 00.15 to O 26 c 85.00 and thence along southern boundary of the counter-battery area.

(2) The area will be divided into an inner and an outer zone by a line running from O 8 d 60.00 to cross roads O 20 a 3.8 and thence

54 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

south along the ST. ELOI-MESSINES ROAD to 4 HUNS FARM (all inclusive to the inner zone).

Prior to zero the divisional artillery will be responsible for answering zone calls within the inner zone—the heavy artillery in the remainder of the corps area.

(3) The dividing lines of responsibility between divisions will be—

(a) Between Thirty-sixth Division and Sixteenth Division: Line N 24 c 85.23 to cross roads O 20 c 20.75.

(b) Between Sixteenth Division and Nineteenth Division: Line N 18 b 23.53 to cross roads O 20 a 3.8.

(4) The above allotment of areas will take effect from 12 noon May 28, 1917.

METHOD OF ANSWERING ZONE CALLS.

G. (1) *Prior to zero.*—Calls will be answered in the normal manner by batteries detailed to do so. L. L. calls will be answered by one 18-pounder and one 4.5-inch howitzer battery in every three and by one section of every 6-inch howitzer and 60-pounder battery which can bring fire to bear upon the target.

(2) *After zero.*—(a) During active operations the only zone calls to be sent down by aeroplanes will be N. F., G. F., M. Q. N. F., L. L., and S. O. S. calls.

(b) (i) *N. F. and M. Q. N. F. calls* will be answered by batteries as detailed in paragraph B.

(ii) *G. F. calls* will be answered by batteries as detailed in paragraph B and also by the six 18-pounder batteries of the Thirty-second Divisional Artillery in the STUIVERBEEK.

N. B.—During the advance from the BLACK Line to the OOSTAVERNE Line these 18-pounder batteries will be employed to form the "creeping barrage" in front of the infantry and will not answer zone calls.

(iii) *L. L. calls.*—During the time our infantry are actually advancing these calls will be answered by all batteries detailed in paragraph B to answer N. F. calls, etc., and by the six 18-pounder batteries in the STUIVERBEEK (except as stated in preceding subparagraph).

During periods of consolidation L. L. calls will be answered by one 18-pounder and one 4.5-inch howitzer battery in every three and by one section of every 60-pounder and 6-inch howitzer battery, including bombardment and barrage batteries, which can bring fire to bear on the target—but during these periods counter-battery howitzers are not to be diverted from tasks on which they are actually engaged in order to answer zone calls.

(iv) *S. O. S. calls*.—The artillery, covering our infantry in the zone sent down, will immediately put up a barrage on their *S. O. S.* lines at *S. O. S.* rates of fire.

Fire to be maintained for half an hour and then wait for another call.

H. *Ammunition*.—The number of rounds to be fired in response to zone calls will depend on the nature and importance of the target and must be left to the discretion of group commanders, but the following suggested number of rounds *per gun*, to be fired in reply to *G. F.* or *L. L.* calls, is given as a guide:

	Rounds.
18-pounder.....	20
4.5-inch howitzer.....	16
60-pounder.....	12
6-inch howitzer.....	10
8-inch howitzer.....	6
9.2-inch howitzer.....	6

I. *Advance to Oostaverne Line*.—When the infantry advance at zero plus 330 minutes from the **BLACK LINE** to the **OOSTAVERNE LINE** all counter-battery work between these lines must cease, except upon the demand of the infantry advancing over that area—and the Ninth Corps zone call area between these lines will be bounded—

(a) On the north by the line **O 15 c 55.95** to **O 16 c 4.2**.

(b) On the south by the line **LUMM FARM** to **O 28 b 5.2**.

APPENDIX A 7.

Ninth Corps Field Artillery forward positions.

[Reference sheet 28. (Map A. 1.) 108 18-pounders; 36 4.5-inch howitzers.]

	Number of position.	Nature.	Location.
Thirty-sixth Division:	F K 6...	18-pounder....	N 35 a 70.95.
"S" group; headquarters; N 29 c 40.32.	F K 7....do.....		N 29 c 70.10.
	F K 18....do.....		N 29 d 35.45.
	F K 8... 4.5-inch how- itzer.		N 29 c 50.20.
"T" group; headquarters N 29 c 50.45.	F K 14... 18-pounder....		N 28 b 80.15.
	F K 15....do.....		N 29 a 45.55.
	F K 17....do.....		N 29 b 10.80.
	F K 13... 4.5-inch how- itzer.		N 29 c 45.85.
Sixteenth Division:	F K 35... 18-pounder....		N 23 a 60.42.
"P" group; headquarters, Irish House, N 23 c 80.75.	F K 36....do.....		N 23 a 70.23.
	F K 37....do.....		N 23 a 67.00.
	F K 38... 4.5-inch how- itzer.		N 23 c 70.80.
"R" group; headquarters S. P. 13, N 17 d 5.3.	F K 31... 18-pounder....		N 17 b 45.30.
	F K 32....do.....		N 17 b 32.18.
	F K 33....do.....		N 17 d 35.92.
	F K 34... 4.5-inch how- itzer.		N 17 d 42.64.
Nineteenth Division:	F K 51... 18-pounder....		N 11 b 52.00.
One hundred and fifty-fifth Field Artillery Brigade; headquarters N 11 a 8.4.	F K 52....do.....		N 11 b 61.27.
	F K 53....do.....		N 12 a 02.38.
	F K 54... 4.5-inch how- itzer.		N 11 b 70.41.
Two hundred and thirty-second Field Artillery Brigade; headquarters N 12 b 2.9.	F K 55... 18-pounder....		N 12 b 8.8.
	F K 56....do.....		O 7 a 00.95.
	F K 57....do.....		O 1 c 3.2.
	F K 58... 4.5-inch how- itzer.		O 1 c 5.4.

APPENDIX A 8.

SPECIAL BOMBARDMENT.

WYTSCHAËTE.

[Reference, par. 41, subpar. (vi).]

1. Commencing at 11 a. m. (zero hour) on 3d June, a concentrated bombardment of WYTSCHAËTE will be carried out by all siege howitzers of Ninth and Second Anzac Corps except counter batteries, which can bear upon those places.

2. Bombardment will last half an hour.

3. Approximate number of siege howitzers which will take part—

Second Anzacs:		Ninth Corps:	
15-inch howitzer.....	1	15-inch howitzers.....	2
9.2-inch howitzers.....	16	12-inch howitzers.....	2
8-inch howitzers.....	4	9.2-inch howitzers.....	24
6-inch howitzers.....	36	8-inch howitzers.....	20
		6-inch howitzers.....	48

4. All siege howitzers will open fire at zero and maintain rates of fire as ordered below until zero plus 30 minutes—

6-inch howitzers, 1 round per gun per minute.

8 and 9.2 inch howitzers, 2 rounds per gun per 3 minutes.

Heavier howitzers, as ordered by B. G.'s H. A. concerned.

5. WYTSCHAËTE Village will be divided into two portions by an east and west line through the church.

The northern portion is allotted to Second Anzacs and the southern portion to Ninth Corps.

6. (a) C. R. A.'s of Nineteenth, Sixteenth, and Thirty-sixth Divisions will each arrange to concentrate the fire of three 18-pounder batteries on the northern, western, and southern exits of the village, respectively, from zero plus 1 minute till zero plus 30 minutes.

Ammunition, 1 round per gun per minute.

(b) B. G. H. A. will arrange for three 60-pounder batteries to sweep the eastern exits of the village from zero plus 1 minute till zero plus 30 minutes.

Ammunition, 1 round per gun per minute.

7. *Gas shell*.—(a) Commencing at zero plus 2 hours C. R. A.'s of Nineteenth, Sixteenth, and Thirty-sixth Divisions will concentrate

58 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

the fire of their 4.5-inch howitzer batteries on WYTSCHÆTE Village.

(b) The village will be divided into three areas: Boundaries are allotted as follows—

Nineteenth Divisional Artillery: Northern boundary, an east and west line through O 19 b 5.6.

Sixteenth Divisional Artillery: Northern boundary, an east and west line through O 19 b 5.3.

Thirty-sixth Divisional Artillery: Northern boundary, an east and west line through O 19 b 5.0. Southern boundary, an east and west line through O 19 d 5.7.

(c) *Ammunition allotment.*—300 rounds LETHAL per divisional artillery to be given in a seven-minute burst of fire, and to be followed by 200 rounds LACHRYMATORY per divisional artillery at a steady rate of fire.

8. Watches will be carefully synchronized with signal time.

A. W. FOOTE,

Major R. A., Staff Officer R. A. Ninth Corps.

JUNE 1, 1917.

APPENDIX A 9.

PRACTICE BARRAGE.

1. A practice barrage will be carried out at 6 p. m. (zero hour) on June 1 on Ninth Corps front, including an overlap on to Tenth Corps and Second Anzac Corps fronts.

Arrangements have been made for the cooperation on our left of the artillery covering the Right Brigade Forty-first Division and the Tenth Corps Heavy Artillery, and on our right of the artillery covering the Left Brigade Twenty-fifth Division and the Second Anzac Heavy Artillery.

2. *Creeping barrage.*—At zero (6 p. m.) the creeping barrage will open on the enemy's front line or as near to our trenches as safety permits.

Zero plus 2 minutes to zero plus 8 minutes.—The barrage will lift off the front line at zero plus 2 minutes and will advance 300 yards by lifts of 100 yards every 2 minutes, when it will remain stationary till zero plus 8 minutes.

Zero plus 8 minutes to zero plus 10 minutes.—At zero plus 8 minutes the barrage will jump back 200 yards and remain stationary till zero plus 10 minutes.

3. *Standing barrage.*—The standing barrage of 18-pounders and 4.5-inch howitzers will open at zero, subsequent lifts being arranged in accordance with the lifts of the creeping barrage.

4. *Heavy artillery.*—

Zero minus 15 minutes to zero.—Bombard objectives between the RED and BLACK LINES, as ordered by B. G.'s H. A. concerned.

Fire to be distributed over the front.

Number of heavy and medium howitzers to be used: Ninth Corps, 80; Tenth and Second Anzac Corps, in proportion.

Zero to zero plus 10 minutes.—Objectives allotted to be in accordance with the lifts of the creeping barrage.

5. *Cease firing.*—All guns will cease firing at zero plus 10 minutes.

6. *Rates of fire.*—Rates of fire throughout will be per gun per minute:

	Rounds.
18-pounders.....	3
4.5-inch howitzers.....	1
Other natures.....	1

60 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

7. *Number of guns.*—In order to induce the enemy to believe that a real attack is intended, *all* 18-pounders and 4.5-inch howitzers which are allotted to cover the front will be used, with the exception of forward guns.

8. *Smoke shell.*—One section per 18-pounder battery will fire smoke shell.

9. *Aeroplanes.*—O. C. Fifty-third Squadron R. F. C. will arrange to have aeroplanes up to spot flashes and report on the barrage.

O. C. No. 5 Balloon Company will arrange for the balloons to carry out similar duties.

10. *Counter-battery work.*—C. B. S. O. will arrange for neutralizing fire to be opened at zero on a certain number of hostile batteries. The object is not to actually stop the hostile guns firing but, by rather ineffective neutralizing fire, to further induce the belief that a real attack is intended.

11. *Time.*—Watches will be synchronized by telephone from R. A. Ninth Corps at 2 p. m. on June 1.

12. *Reports* (Ninth Corps artillery only).—Attention is directed to paragraph 41, subparagraph (vi), re reports to be sent to R. A. Ninth Corps.

APPENDIX A 9/1.

PRACTICE BARRAGE NO. 2.

1. Immediately following the combined bombardment of WYTSCHAETE on June 3 a practice barrage will be carried out on Ninth Corps front, including an overlap on Tenth and Second Anzac Corps fronts.

Arrangements have been made for the cooperation, on our left, of the artillery covering the right brigade Forty-first Division and the Tenth Corps heavy artillery, and on our right, of the artillery covering the left brigade Twenty-fifth Division and the Second Anzac Corps heavy artillery.

2. *Creeping barrage.*—At zero (11.30 a. m.) the creeping barrage will open on the enemy's front line or as near to our trenches as safety permits.

Zero plus 2 minutes to zero plus 8 minutes.—The barrage will lift off the front line at zero plus 2 minutes and will advance 300 yards in lifts of 100 yards every 2 minutes where it will remain stationary till zero plus 8 minutes.

Zero plus 8 minutes to zero plus 10 minutes.—At zero plus 8 minutes the barrage will jump back to German support line and remain stationary till zero plus 10 minutes.

3. *Standing barrage.*—The standing barrage of 18-pounder and 4.5-inch howitzers will open at zero, subsequent lifts being arranged in accordance with the lifts of the creeping barrage.

4. *Heavy artillery.*—Number of heavy and medium howitzers to be used: Ninth Corps, 80; Tenth and Second Anzac Corps, in proportion.

Zero (11.30 a. m.) to zero plus 10 minutes.—Objectives to be in accordance with the lifts of the creeping barrage.

5. *Cease firing.*—All guns will cease firing at zero plus 10 minutes.

6. *Rates of fire.*—Rates of fire throughout will be, per gun per minute:

	Rounds.
18-pounder.....	3
4.5-inch howitzer.....	1
Other natures.....	1

62 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

7. *Number of guns.*—In order to induce the enemy to believe that a real attack is intended *all* 18-pounder and 4.5-inch howitzers which are allotted to cover the front will be used, with the exception of forward guns.

8. *Smoke shell.*—One section per 18-pounder battery will fire smoke shell.

9. *Aeroplanes.*—O. C. Fifty-third Squadron R. F. C. will arrange to have aeroplanes up to spot flashes and report on the barrage.

O. C. No. 5 Balloon Company will arrange for the balloons to carry out similar duties.

10. *Counter-battery work.*—Counter-battery staff officer will arrange for neutralizing fire to be opened at zero on a certain number of hostile batteries. The object is not to actually stop the hostile guns firing but, by rather ineffective neutralizing fire, to further induce the belief that a real attack is intended.

11. *Time.*—Watches will be synchronized by telephone from R. A. Ninth Corps at 8.30 a. m. on June 3.

12. *Reports* (Ninth Corps artillery only).—Attention is directed to paragraph 41, subparagraph (vii), reports to be sent to R. A. Ninth Corps.

APPENDIX A 10.

NOTES ON THE USE OF LETHAL AND LACHRYMATORY SHELLS.

1. *Objects*.—(a) To surprise and kill the enemy, especially in dugouts, before he can adjust his respirator; (b) to neutralize his effectiveness by forcing him to wear his respirator; (c) to wear out and penetrate his respirator.

(a) Requires a sudden burst of lethal shells. (b) and (c) Prolonged bombardment with lachrymators with occasional bursts of P. S. and lethal shells. (The enemy is not provided with separate goggles.)

2. *Conditions for fire*.—(a) Wind must be under 7 minutes per hour (10 feet per second); (b) it must not be raining heavily.

3. *Method of fire*.—(a) Point engaged to be 25 yards to windward of target. No gun to engage more than a front of 20 yards; (b) *lethal shells* should always be fired in rapid bursts (never less than 50 rounds to be used); (c) *lachrymators*, two rounds per yard of front for the first hour; afterwards one round per yard per hour.

NOTE.—P. S. may be used as laid down either in (b) or (c).

4. *Danger to our own troops*.—(a) Except under special instructions—

S. K. will not be used against positions likely to be occupied within 36 hours.

P. S. will not be used against positions likely to be occupied within 8 hours.

C. B. R. will not be used against positions likely to be occupied within 2 hours.

J. B. R., V. N., J. L. will not be used against positions likely to be occupied within 1 hour.

NOTE.—Gas may remain in dugouts for 12 hours.

(b) When wind is blowing toward our line gas shells should not be fired at points within 1,500 yards, and not more than 100 in any half hour should be used except under special instructions.

5. *Properties of substances*.—J. B. R. (3 red bands), J. L. (2 red bands), V. N. (1 white, 1 red band), lethal not lachrymatory.

64 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

C. B. R. (1 red band), lethal and slightly lachrymatory.

P. S. (1 white band), very violent irritant to eyes and lungs; slightly lethal (strong concentrations penetrate German respirator).

S. K. and K. S. K. (no bands), strongly lachrymatory but not lethal.

NOTE.—If a dump of gas shells is hit, only those shells actually struck are affected; damaged shells which are leaking should be buried by men wearing respirators.

APPENDIX A 11.

SECOND ARMY DEMONSTRATION.

1. On June 3 a demonstration will be made on the whole front of the Second Army and will commence at 3 p. m. If weather conditions are unfavorable, the demonstration will be postponed till 4 p. m. June 3 or till 3 p. m. June 4.

2. The attached program will be carried out.

Zero hour will be 3.15 p. m. (unless postponed, vide par. 1), at which time the barrage opens.

During the demonstration counter-battery work will be reduced to the minimum necessary to maintain the deception.

As little wireless as possible will be used and will be limited to a few machines detailed to engage certain well-known batteries and send the usual corrections.

The batteries selected for treatment should be those least likely to interfere with the work of the flash-spotting aeroplanes.

Normal progress of counter-battery work and bombardments will be resumed at 3.45 p. m.

4. Coordination of flash-spotting work by aeroplanes will be carried out by the Second Brigade R. F. C.

Counter-battery intelligence officers will interview observers on the landing ground and ascertain from them what enemy batteries have been observed.

5. From zero minus 15 to zero, divisional artilleries will vigorously carry out their normal bombardment with those batteries not employed on special tasks, the majority of the fire being directed on the enemy's front and support line.

6. *Time.*—Instructions will be issued later for synchronization of watches.

A. W. FOOTE,

Major R. A., Staff Officer R. A. Ninth Corps.

JUNE 1, 1917.

APPENDIX A 11.

PROGRAM OF DEMONSTRATION.

Unit.	Time.		Operation.	Rate of fire.
	From—	To—		
Ninth Corps heavy artillery (80 heavy and medium howitzers).	0—15	0—10	Bombardment of selected points between RED and BLACK Lines.	Moderate.
Do.....	0—10	0—5	.....do.....	Increasing to intense.
Do.....	0—5	0	.....do.....	Intense.
Sixteenth Divisional Artillery.	0—30	0	Expend 300 rounds 4.5-inch howitzer. Smoke shell to form a smoke screen on the front edge of WYTSCHAETE. Shell to be placed according to the direction of the wind.	Do.
Sixteenth, Nineteenth, and Thirty-sixth Divisional Artilleries.	0—20	0—5	Each divisional artillery will expend 100 lachrymatory shell to mix with the smoke screen on the front edge of WYTSCHAETE.	As required.
Do.....	0—15	0	Half the available 2-inch trench mortars will bombard German front and support lines.	Intense.
Do.....	0	0+15	Fifteen minutes barrage according to barrage map A 2. 18-pounder and 4.5-inch howitzer standing barrages as arranged for first 15 minutes on Z-day. 18-pounders of standing barrage to use smoke shell for first 2 minutes firing at a rate of 8 rounds per gun per minute.	18 pounders, 4 rounds per gun per minute for 2 minutes, then 3 rounds per gun per minute; 4.5-inch howitzers, 2 rounds per gun per minute for 2 minutes, then 1 round per gun per minute.
Ninth Corps heavy artillery.	0	0+15	First 15 minutes of program arranged for Z-day.	1 round per gun per minute.

APPENDIX A 12.

SECOND ARMY DEMONSTRATION.

1. On June 5 a demonstration will be made on the whole front of Second Army and will last for 10 minutes.
2. Zero hour will be 3 p. m.
3. From zero to zero plus 10 minutes divisional artillery groups and heavy artillery will carry out the first 10 minutes of their attack program for Z-day.
4. No smoke shell will be used.
5. Following guns will be used—(i) All available 18-pounders and 4.5-inch howitzers; (ii) 80 heavy and medium howitzers exclusive of counter-battery guns.
6. Instructions for counter-battery work will be as in Appendix A 11.
7. Fifty-third Squadron and No. 5 Balloon Company will cooperate in the normal manner.
8. All artillery fire except counter-battery work will cease from zero minus 5 minutes to zero.
9. Watches will be carefully synchronized as laid down in paragraph 79.

A. W. FOOTE,
Major R. A., Staff Officer R. A. Ninth Corps.

JUNE 4, 1917.

APPENDIX A 13.

The following boundaries between corps counter-battery and zone call areas will come into force from 12 midnight June 5/6 and will remain the same during the forthcoming operations.

1. *Between Second Anzac Corps and Ninth Corps.*—An east and west line between squares O 29 and O 35.

2. *Between Ninth and Tenth Corps.*—Southern line of squares O 9, 10, thence along western line of square O 17 and the southern line of squares O 17, 18.

3. *Eastern boundary of Ninth Corps area.*—Eastern edge of squares O 24, 30.

4. Squares P 19, 20, 21, etc., will be added to Tenth Corps area, and squares P 25, 26, 27, etc., to the Second Anzac Corps area.

APPENDIX A 14.

FURTHER ADVANCE FROM BLACK LINE.

Rates of fire of creeping and standing barrages.

Time.	18-pounder creeping barrage, rounds per gun per minute.	18-pounder standing barrage, rounds per gun per minute.	4.5-inch howitzers, rounds per gun per minute.
320 to 325.....	3, 100 per cent A..	3, 75 per cent A X.	2.
325 to 351.....	2, 100 per cent A..	2, 75 per cent A X.	1.
351 to 390.....	1, 75 per cent A X.	Stop firing except for "S. O. S." and zone calls.	
NEW ZERO.			
Zero minus 15 minutes to zero.	2, 100 per cent A..	2, 75 per cent A X.	1.
Zero to zero plus 38. . .	3, 100 per cent A..	3, 75 per cent A X.	2.
Zero plus 38 to plus 44.	2, 100 per cent A..	Stop firing except for "S. O. S." and zone calls at zero plus 38.	
Zero plus 44 to zero plus 65.	1, 75 per cent A X.	Slackening to one-half round per gun per minute.	
Zero plus 65 onward...	Stop firing except for "S. O. S."		

NINTH CORPS HEAVY ARTILLERY ORDER NO. 39.

1. Programs for action of Ninth Corps heavy artillery (a) up to zero plus 330 minutes (marked A), (b) after zero plus 330 minutes (marked B) are attached.

2. Rates of fire will be as under.

6-inch howitzer:

Zero plus 0 minute to zero plus 10 minutes, 2 rounds a gun a minute.

Zero plus 10 minutes to zero plus 35 minutes, 3 rounds a gun in 2 minutes.

Zero plus 35 minutes to zero plus 65 minutes, 1 round a gun in 2 minutes.

Zero plus 65 minutes to zero plus 100 minutes, 3 rounds a gun in 2 minutes.

Zero plus 100 minutes to zero plus 220 minutes, 1 round a gun in 3 minutes.

70 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

6-inch howitzer—Continued.

Zero plus 220 minutes to zero plus 250 minutes, 3 rounds a gun in 2 minutes.

Zero plus 250 minutes to zero plus 330 minutes, 1 round a gun in 2 minutes.

Zero plus 330 minutes to new zero minus 30 minutes, 1 round a gun in 3 minutes.

New zero minus 30 minutes to new zero, 3 rounds a gun in 2 minutes.

New zero to new zero plus 50 minutes, 1 round a gun in 2 minutes.

8-inch and 9.2-inch howitzers half these rates, except from zero plus 0 to zero plus 10, when fire will be at 1 round in three quarters of a minute.

12-inch howitzers and 15-inch howitzers will fire deliberately. The 12-inch howitzers should be prepared to fire 75 rounds each, the 15-inch 50 rounds each.

Average rate of fire of 60-pounders not to exceed 30 rounds a gun an hour.

3. Action of the 6-inch, Mark VII, and 60-pounders on Z-day is also attached (marked C).

Acknowledge.

C. P. G. CAMERON,

Captain, R. A., Brigade Major Ninth Corps Heavy Artillery.

Issued at 12.30 p. m., June 5, 1917.

Copies to—

No. 1, Ninth Corps, R. A.

No. 2, Sixteenth Division.

No. 3, Nineteenth Division.

No. 4, Thirty-sixth Division.

No. 5, Sixteenth Divisional Artillery.

No. 6, Nineteenth Divisional Artillery.

No. 7, Thirty-sixth Divisional Artillery.

No. 8, C. B. S. O.

No. 9, Fifty-third Squadron R. F. C.

No. 10, No. 5 Balloon Company.

No. 11, Tenth Corps heavy artillery.

No. 12, Second Anzac heavy artillery.

No. 13, Forty-first heavy artillery group.

No. 14, Forty-fifth heavy artillery group.

No. 15, Fifty-first heavy artillery group.

No. 16, Ninety-third heavy artillery group.

Copies to—

- No. 17, Twenty-fourth heavy artillery group.
- No. 18, Sixty-sixth heavy artillery group.
- No. 19, Fifty-seventh heavy artillery group.
- No. 20, Fifty-third heavy artillery group.
- No. 21, Seventy-sixth heavy artillery group.
- No. 22, Seventy-third heavy artillery group.
- No. 23, Lieut. Col. A. M. Tyler, R. G. A.
- No. 24, Lieut. Col. E. McM. Seddon, R. G. A.
- No. 25, Lieut. Col. E. L. Bond, R. G. A.
- Nos. 26 and 27, war diary.
- No. 28, file.

Program for Z-day up to zero plus 330 minutes.

HOSPICE GROUP.

Task.	Battery.	From—	To—	Target.	Fuze.
No. 1...	275, siege, 4 8-inch howitzers.	Zero.....	Zero plus 59...	3 guns Ocean Crescent O 25 a 81.93 to O 25 b 20.49; 1 gun Ocean Avenue O 25 b 57.91 to 75.70.	106
		Zero plus 59...	Zero plus 222...	Trench O 19 d 78.70 to 93.27	D. A.
		Zero plus 222...	Zero plus 300...	Southeast edge of Oostaverne Wood O 20 b 52.75 to O 20 b 82.87.	D. A.
		Zero.....	Zero plus 3...	Naples Reserve N 30 b 70.70 to 83.40.	D. A.
		Zero plus 5...	Zero plus 59...	Skip Point and trench from O 25 b 20.49 to O 25 b 05.20.	106
No. 2...	278, siege, 4 6-inch howitzers.	Zero plus 59...	Zero plus 67...	Ocean Avenue and Ochre Trench O 25 b 77.70 to 80.42.	D. A.
		Zero plus 67...	Zero plus 100...	Ochre Avenue O 19 d 79.05 to O 25 b 90.75.	D. A.
		Zero plus 100...	Zero plus 222...	O 20 c 90.00 to O 20 a 13.75.	D. A.
		Zero plus 222...	Zero plus 300...	Southeast edge of Oostaverne Wood O 20 b 90.70 to O 21 a 12.23.	D. A.
		Zero.....	Zero plus 3...	Naples Reserve N 30 b 83.40 to 91.03.	D. A.
No. 3...	270, siege, 4 6-inch howitzers.	Zero plus 3...	Zero plus 72...	Ochre Trench O 25 b 80.42 to 91.00.	106
		Zero plus 72...	Zero plus 100...	Ochre Avenue O 25 b 90.75 to O 26 a 10.38.	D. A.
		Zero plus 100...	Zero plus 222...	O 26 a 13.75 to 30.35.	D. A.
		Zero plus 222...	Zero plus 270...	Search area O 21 d 00.55 to O 22 c 00.50 to O 21 d 50.40 to O 21 d 00.70.	106
		Zero.....	Zero plus 3...	Narrow Reserve N 30 b 01.03 to N 30 d 09.64.	D. A.
No. 4...	155, siege, 4 6-inch howitzers.	Zero plus 3...	Zero plus 72...	L'Enfer Farm and Ochre trench from O 25 b 91.00 to O 25 d 74.80 to 91.62.	D. A.
		Zero plus 72...	Zero plus 100...	Petit Puits and trench from O 26 a 28.31 to O 26 c 43.83.	D. A.
		Zero plus 100...	Zero plus 270...	Torcken Farm O 20 d 17.30.	D. A.
		Zero plus 270...	Zero plus 320...	Search within area bounded by O 21 c 50.10 to O 21 d 30.40 to 37.30 to O 21 c 80.00 to O 27 a 57.95.	D. A.
		Zero.....	Zero plus 3...	Narrow Reserve N 30 d 09.64 to N 30 c 98.28.	D. A.
No. 5...	301, siege, 4 6-inch howitzers.	Zero plus 3...	Zero plus 25...	1 gun Earl Farm in O 25 d	D. A.
		Zero plus 25...	Zero plus 62...	3 guns Ochre Trench O 25 d 91.62 to 80.31.	D. A.
		Zero plus 62...	Zero plus 100...	Ochre Trench O 25 d 91.62 to 80.31.	D. A.
		Zero plus 100...	Zero plus 240...	12 guns October Support O 26 c 43.83 to 58.65.	D. A.
		Zero plus 240...	Zero plus 320...	12 guns October Avenue and Lumm's Farm O 26 c 50.75 to O 26 d 12.73.	D. A.
				Bay Farm O 26 b 80.61 and farm at O 27 a 33.60.	D. A.
				Farm at O 27 a 89.82	D. A.

No. 6...	206, siege, 4 6-inch howitzers.	Zero.....	Zero plus 3....	Narrow Reserve N 30 c 98.28 to N 30 c 99.08; road from N. 30 c 99.08 to N 30 b 24.90. L'Enfer Wood from O 25 d 24.20 to O 31 b 15.80. Eastern edge of L'Enfer Wood O 25 d 70.25 to 80.03. October Trench O 26 c 95.61 to 85.21. October Support O 26 c 95.65 to 86.31. Farm at O 25 d 88.82 and O 27 a 10.10. Farm at O 27 d 15.98. 1 gun Ocean Avenue O 25 b 00.80 to 50.97; 1 gun Ocean Lane O 25 d 20.49 to 75.76; 1 gun Ochre Avenue O 19 d 80.00 to O 25 b 90.75; 1 gun Ochre Trench O 25 b 75.70 to 80.27 searching eastwards as far as Ochre Avenue; 1 gun Ocean Avenue O 25 d 92.85 to O 26 c 70.75; 1 gun Trench O 26 c 12.50 to 20.25 to 84.25. Search on line from O 20 c 30.40 to O 26 c 74.90 to O 26 d 50.75. Search on line from O 20 d 40.45 to Bay Farm O 27 c 10.80. Search from O 21 c 80.00 to O 21 c 70.50; O 21 c 80.00 to O 27 d 60.90 to O 28 a 00.10.
		Zero plus 3....	Zero plus 25....	
		Zero plus 25....	Zero plus 67....	
		Zero plus 67....	Zero plus 86....	
		Zero plus 86....	Zero plus 234....	
No. 7...	146, Heavy, 6 60-pounders.	Zero plus 86....	Zero plus 230....	D. A. D. A. D. A. D. A. D. A.
		Zero.....	Zero plus 67....	
		Zero plus 67....	Zero plus 100....	
		Zero plus 100....	Zero plus 234....	
		Zero plus 234....	Zero plus 270....	

KEMMEL GROUP.

No. 1...	223, siege, 4 6-inch howitzers.	Zero.....	Zero plus 3....	Naples Reserve N 24 d 78.08 to N 30 b 70.70. 2 guns Trench and Road O 19 c 97.35 to 75.10; 2 guns Ocean Switch O 19 d 13.25 to 00.00. Ochre Avenue O 19 d 60.30 to 77.05. O 19 d 93.26 to O 20 c 00.00. Area bounded by Oil Trench on the west and a line O 21 a 25.76 to O 21 a 50.00 on the east. O 13 c 30.80 to N 24 b 95.80. O 13 c 90.67 to O 13 c 57.35 to O 19 a 40.57. O 19 b 65.90 to O 19 b 08.60 to O 19 b 20.40. O 20 a 00.80 to O 19 b 75.38. Area O 21 b 58.72 to 45.88 to 80.45. N 24 b 95.80 to N 24 d 90.55. O 13 a 40.57 to O 19 a 54.20 to O 19 c 15.60. O 19 b 20.40 to O 19 d 35.60. O 20 b 75.38 to O 19 d 75.95. Leg Copse O 20 b.....
		Zero plus 3....	Zero plus 59....	
		Zero plus 59....	Zero plus 100....	
		Zero plus 100....	Zero plus 220....	
		Zero plus 220....	Zero plus 300....	
No. 2...	299, siege, 4 6-inch howitzers.	Zero.....	Zero plus 4....	D. A. D. A. D. A. D. A. D. A.
		Zero plus 4....	Zero plus 16....	
		Zero plus 16....	Zero plus 72....	
		Zero plus 72....	Zero plus 220....	
		Zero plus 220....	Zero plus 300....	
No. 3...	283, siege, 4 6-inch howitzers.	Zero.....	Zero plus 4....	D. A. D. A. D. A. D. A. D. A.
		Zero plus 4....	Zero plus 16....	
		Zero plus 16....	Zero plus 72....	
		Zero plus 72....	Zero plus 220....	
		Zero plus 220....	Zero plus 234....	

Program for Z-day up to zero plus 330 minutes—Continued.

KEMMEL GROUP—Continued.

Task.	Battery.	From—	To—	Target.	Fuse.
No. 4...	405, siege, 4 6-inch howitzers.	Zero..... Zero plus 4..... Zero plus 65..... Zero plus 220..... Zero plus 300.....	Zero plus 4..... Zero plus 65..... Zero plus 220..... Zero plus 300.....	O 13 c 90.67 to O 13 c 57.35 to O 19 a 40.57. O 19 b 55.90 to O 19 b 08.60 to O 19 b 20.40. O 20 a 00.80 to O 19 b 75.33 Area bounded by Oil Trench on the west and a line O 21 a 25.76 to O 21 a 50.00 on the east.	106 106 106 D. A.
No. 5...	33, siege, 4 8-inch howitzers.	Zero..... Zero plus 4..... Zero plus 72..... Zero plus 220..... Zero plus 300..... Zero plus 330.....	Zero plus 4..... Zero plus 72..... Zero plus 220..... Zero plus 300..... Zero plus 330.....	O 19 d 40.60 to O 19 b 30.20. O 19 b 67.50 to O 19 d 60.95 O 20 a 20.80 to O 20 c 20.80 O 21 a 12.23 to O 15 c 33.00 Occasion Alley O 19 c 80.88 to O 19 d 25.95 O 19 d 60.75 to O 19 b 40.75 O 19 d 96.75 to O 20 b 24.61 Oostaverne Trench O 15 c 00.93 to 80.90	106 D. A. D. A. D. A. D. A. D. A.
No. 6...	62, siege, 4 9.2-inch howitzers.	Zero..... Zero plus 4..... Zero plus 135..... Zero plus 220..... Zero plus 245..... Zero plus 300..... Zero plus 330.....	Zero plus 4..... Zero plus 135..... Zero plus 220..... Zero plus 245..... Zero plus 300..... Zero plus 330.....	Dugouts O 15 d 11.6 Dugouts O 15 d 11.6 Dugouts O 15 d 11.6 Dugouts O 15 d 11.6 Dugouts O 15 d 11.6 Dugouts O 15 d 11.6 Dugouts O 15 d 11.6	106 D. A. D. A. D. A. D. A. D. A. D. A.
No. 7...	185, siege, 4 9.2-inch howitzers.	Zero..... Zero plus 4..... Zero plus 135..... Zero plus 220..... Zero plus 245..... Zero plus 300..... Zero plus 330.....	Zero plus 4..... Zero plus 135..... Zero plus 220..... Zero plus 245..... Zero plus 300..... Zero plus 330.....	Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90	106 D. A. D. A. D. A. D. A. D. A. D. A.
No. 8...	2/1 North Midland heavy battery, 6 60-pounders.	Zero..... Zero plus 4..... Zero plus 135..... Zero plus 220..... Zero plus 245..... Zero plus 300..... Zero plus 330.....	Zero plus 4..... Zero plus 135..... Zero plus 220..... Zero plus 245..... Zero plus 300..... Zero plus 330.....	Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90 Oostaverne Trench O 15 c 00.93 to 80.90	106 D. A. D. A. D. A. D. A. D. A. D. A.

LA OLYTTE GROUP.

Task.	Battery.	From—	To—	Target.	Fuse.
No. 1...	274, siege, 4 6-inch howitzers.	Zero..... Zero plus 4..... Zero plus 65..... Zero plus 220..... Zero plus 240.....	Zero plus 4..... Zero plus 65..... Zero plus 220..... Zero plus 240.....	O 19 a 40.57 to O 19 a 54.20 to O 19 c 15.20 O 19 b 20.40 to O 19 d 35.00 O 19 b 75.38 to O 19 d 75.95 O 20 a 90.95 to O 14 d 30.15	106 106 106 106

No. 2...	180, siege, 4 6-inch howitzers.	Zero..... Zero plus 5..... Zero plus 60.....	Zero plus 5..... Zero plus 60..... Zero plus 222.....	Obstruction trench O 7 d 50.25 to 90.45. Obustimate trench O 8 c 98.18 to 8 d 25.00..... Obustimate trench O 14 c 85.30 to 8 d 25.00.....	D. A. A. D. A. A. D. A. A.
No. 3...	248, siege, 4 6-inch howitzers.	Zero..... Zero plus 5..... Zero plus 15..... Zero plus 35..... Zero plus 70..... Zero plus 210..... Zero plus 250.....	Zero plus 5..... Zero plus 15..... Zero plus 35..... Zero plus 70..... Zero plus 210..... Zero plus 250.....	Obustimate trench O 13 b 10.80 to O 7 d 40.10..... Obustimate trench O 13 b 50.40 to 80.55..... Obustimate trench O 13 b 50.40 to 80.65..... Corner of Ourset Wood O 14 c 23.48 to 28.72..... Ourset Wood O 14 c 55.65..... Obustimate trench O 14 d 65.15 to 95.40..... Trench on southern edge of Oustavere Wood O 20 b 50.75 to O 15 c 55.15.....	D. A. A. D. A. A. D. A. A. D. A. A. D. A. A. D. A. A. D. A. A.
No. 4...	182, siege.	Zero..... Zero plus 5.....	Zero plus 5..... Zero plus 15.....	Obustimate trench O 13 a 55.15 to 70.30, O 13 a 90.40 to 90.65..... Obustimate trench O 13 c 70.90 to O 13 a 85.10, O 13 a 95.25 to O 13 b 20.45.....	D. A. A. D. A. A.
No. 5...	286, siege.	Zero plus 15..... Zero plus 35..... Zero plus 220..... Zero..... do..... Zero plus 20..... Zero plus 60.....	Zero plus 35..... Zero plus 220..... Zero plus 240..... Zero plus 20..... do..... Zero plus 20..... Zero plus 222.....	Obustimate trench O 13 c 92.65 to 95.85, O 13 b 10.00 to 40.25..... Obustimate trench O 14 c 60.15 to 14 d 18.57..... Somers Farm and Area O 14 c 90.25..... 1 section Cateau Farm Area O 8 c 82.50 to 80.20..... 1 section Cateau Farm Area O 8 c 80.20 to 98.12..... 1 section Evans Farm and Trenches O 14 b 30.20..... do.....	D. A. A. D. A. A. D. A. A. D. A. A. D. A. A. D. A. A. D. A. A.
No. 6...	129, heavy battery, 6 60-pounders.	Zero plus 220..... Zero..... Zero plus 220.....	Zero plus 220..... Zero plus 250.....	Obustimate trench O 19 b 60.85 to O 14 c 35.10..... Area O 20 b 90.20 to 85.70.....	D. A. A. D. A. A. D. A. A.
HALLEBAST GROUP.					
No. 1...	151, siege, 4 8-inch howitzers.	Zero..... do.....	Zero plus 35..... Zero plus 225.....	1 section Obustimate Alley O 19 b 55.75 to 82.90..... 1 section Obustimate Alley O 14 c 60.15 to 35.10..... 1 section Obustimate Alley O 19 b 82.90 to O 13 d 98.13.....	D. A. A. D. A. A. D. A. A.
No. 2...	285, siege, 4 6-inch howitzers.	Zero plus 35..... Zero plus 55..... Zero plus 95..... Zero plus 210.....	Zero plus 35..... Zero plus 55..... Zero plus 95..... Zero plus 210.....	Obustimate trench O 13 b 95.60 to O 14 a 25.73..... Obustimate trench O 14 b 00.80 to 10.40..... Obustimate trench O 14 a 95.20 to 13.10..... Obustimate trench O 14 a 95.20 to 15 c 20.60.....	D. A. A. D. A. A. D. A. A. D. A. A.
No. 3...	174, siege, 4 6-inch howitzers.	Zero..... Zero plus 90..... Zero plus 220.....	Zero plus 90..... Zero plus 220.....	Obustimate trench O 14 a 65.45 to 90.75..... Obustimate trench O 14 d 25.60 to O 14 b 00.90..... Houses and dugouts O 14 d 3.4.....	D. A. A. D. A. A. D. A. A.

Program for Z-day up to zero plus 530 minutes—Continued.

SUPERHEAVY GROUP.

Task.	Battery.	From—	To—	Target.	Fuze.
No. 1...	239, siege, 4 8-inch howitzers.	Zero.....	Zero plus 67...	2 guns Occasion Trench O 19 c 90.78 to 98.38, 2 guns Occasion Trench O 19 d 63.40 to 55.38.	106
No. 2...	265, siege, 4 9.2-inch howitzers	Zero plus 67...	Zero plus 222...	O 15 c 33.00 to O 15 c 60.13.	106
No. 3...	No. 2 R. M. A., 1 15-inch howitzer.	Zero plus 35...	Zero plus 280...	Trench O 19 b 80.14 to O 20 a 16.05.	D. A.
No. 4...	No. 5 R. M. A., 1 15-inch howitzer.	do.....	do.....	O 19 d 80.90 to O 20 c 17.80.	D. A.
		Zero plus 220...	Zero plus 280...	O 20 b 80.75.....	D. A.
		Zero plus 35...	Zero plus 100...	O 19 d 46.63.....	D. A.
		Zero plus 220...	Zero plus 220...	O 20 b 60.30 to O 20 b 70.00.	D. A.
No. 5...	82, siege, 1 12-inch howitzer..	Zero plus 35...	Zero plus 280...	O 21 a 00.90.....	D. A.
No. 6...	80, siege, 2 12-inch howitzers.	Zero plus 220...	Zero plus 275...	O 20 a 22.32.....	D. A.
No. 7...	235, siege, 4 9.2-inch howitzers	Zero plus 35...	Zero plus 280...	Dugouts O 15 c 43.35.	D. A.
No. 8...	262, siege, 4 8-inch howitzers.	Zero plus 220...	Zero plus 285...	1 gun O 19 b 59.28, 1 gun O 19 d 60.93	D. A.
		Zero.....	Zero plus 215...	1 gun O 15 c 40.05, 1 gun O 15 c 50.15.	D. A.
		Zero plus 90...	Zero plus 210...	O 19 b 80.14 to O 20 a 16.05.	D. A.
				Dugouts O 15 c 70.53.	D. A.
				1 section Onraet Farm and Trench O 14 c 30.95 to O 14 a 30.10.	D. A.
				1 section Onraet Farm and Trench O 14 a 30.10 to 60.35.	D. A.
				1 section Obtuse Avenue O 14 a 62.26 to 85.22.	D. A.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 77

1. The army commander has decided that there will be a new zero hour for the advance from the MAUVE LINE to the OOSTAVERNE LINE.

This will be known as "New zero."

The time of NEW ZERO will be notified later.

2. The following battery positions and targets will be engaged as under:

Zero plus 330 to zero plus 340, 180 siege battery: 2 guns O 21 d 52.49, 2 guns O 21 d 73.63.

Zero plus 330 to zero plus 340, 182 siege battery: 2 guns O 27 b 94.23, 2 guns O 27 b 89.68.

Zero plus 330 to zero plus 345, 278 siege battery: 2 guns O 28 a 09.37, 2 guns O 28 a 23.52.

Zero plus 330 to zero plus 350, 301 siege battery: 2 guns O 22 c 17.65, 2 guns O 22 a 27.19.

Zero plus 330 to new zero minus 30, 283 siege battery: 2 guns O 28 a 73.90, 2 guns O 28 a 91.86.

Zero plus 330 to new zero minus 30, 299 siege battery: 2 guns O 28 b 18.90, 2 guns O 28 b 39.79.

Zero plus 330 to new zero minus 30, 62 siege battery: 3 guns on Oostaverne Village, 1 gun on Mahieu Farm.

3. The Oostaverne Line will be steadily bombarded until new zero minus 30 by batteries in reliefs as under:

Zero plus 330 to zero plus 400.	Zero plus 400 to zero plus 500.	Zero plus 500 to new zero minus 30.	Target.
203, siege battery....	151, siege battery..	239, siege battery..	O 18 c 00.30 to O 22 a 23.27.
275, siege battery....	185, siege battery..	262, siege battery..	O 22 a 23.27 to O 22 c 50.63.
206, siege battery....	223, siege battery..	174, siege battery..	O 22 c 50.63 to O 22 c 88.30.
270, siege battery....	405, siege battery..	285, siege battery..	O 22 c 88.30 to O 28 b 73.00.
155, siege battery....	33, siege battery...	286, siege battery..	O 28 b 73.00 to O 28 a 89.15.

78 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

The OOSTAVERNE Support Line will be steadily bombarded until new zero minus 30 by batteries in reliefs as under:

Zero plus 350 to zero plus 475.	Zero plus 475 to new zero minus 30.	Target.
180, siege battery.....	182, siege battery.....	O 16 c 55.00 to O 22 a 55.30.
151, siege battery.....	248, siege battery.....	O 22 a 55.30 to O 22 c 95.76.
273, siege battery.....	301, siege battery.....	O 22 c 95.76 to O 22 d 25.00.
283, siege battery.....	290, siege battery.....	O 22 d 25.00 to O 28 b 50.15.

4. From new zero minus 30 to new zero an intense bombardment of OOSTAVERNE line and support line will be carried out by all batteries mentioned in paragraph 3 at the targets mentioned opposite those batteries in that paragraph.

5. From new zero to new zero plus 50 fire will lift and move forward 800 yards by lifts of 200 yards every 5 minutes.

At new zero plus 50 all guns will stop firing and not reopen without orders.

ACTION OF 60-POUNDERS AND 6-INCH VII ON Z-DAY.

1. On Z day 116 and 135, heavy batteries, and 29, siege battery, will be used for counter-battery work up till zero plus one hour.

2. After zero plus one hour these guns will carry out their day barrage tasks. They will not execute tasks 5 and 6 after zero plus 220 minutes.

Ammunition.—6-inch Mark VII, 10 rounds per gun per hour; 60-pounders, 30 rounds per gun per hour.

3. From new zero minus 30 to new zero plus 10 targets will be engaged as follows:

129, heavy battery, O 23 a 75.50 to b 40.60; 200 yards wide.

2/1 N. Midland, heavy battery, O 22 b 80.45 to O 23 a 4.5; 150 yards wide.

146, heavy battery, O 29 a 80.55 to O 29 b 40.30; 150 yards wide.

**AMENDMENTS TO NINTH CORPS HEAVY ARTILLERY
ORDER NO. 39.**

1. Hospice Group.—Task 7, that part of 146 H. B.'s task which reads 1 gun OCTOBER AVENUE, 1 gun trench O 26 c 12.50 to 20.25; 84.25, will be carried out by the rear section of 122 heavy battery.

In addition, 1 gun of 122 H. B. will, from zero to zero plus 67, fire with one gun on trench O 19 d 50.60 to 70.08.

2. Kemmel Group.—Task 2, line 2, O 19 c 40.57 should read O 19 a 40.57.

Task 3, line 2, O 13 a 40.57 should read O 19 a 40.57; line 4, O 20 b 75.38 should read O 19 b 75.38.

Task 6, line 3, O 20 b 24.61 should read O 20 c 24.61.

Task 7, line 1, should read OBVIOUS TRENCH O 19 b 30.87 to O 19 b 70.89.

3. La Olytte Group.—Task 4, line 5, should read, O 13 c 92.65 to d 05.85.

4. Hallebast Group.—Task 2, OBTUSE AVENUE should read O 14 a 88.25 to b 13.10; task 3, OOSTAVERNE Trench should read O 14 d 25.60 to O 14 b 90.00.

5. Super-Heavy Group.—Delete task No. 2; task 7 will be carried out by 203 siege battery (under 53 H. A. Group) instead of by 265 siege battery.

6. *Program after Z plus 330.*—In paragraph 2 the tasks laid down for 283 and 299 siege batteries will be carried out by batteries of the C. B. groups under orders of the counter-battery S. O.

In paragraph 3 the task for 155 siege battery will be carried out by 299 siege battery.

In paragraph 3 the point O 16 c 00.30 should read O 16 c 30.00, and the point O 28 b 73.00 (appearing in two places) should read O 28 b 00.73.

In paragraph 3 the task for 151 S. B. will be carried out by 204 siege battery.

Insert new paragraph No. 6.

Paragraph 6. From new zero minus 30 minutes to new zero plus 50 minutes fire will be directed at high ground and trenches in O 24 c

80 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

and O 30 a whence long-range machine-gun fire might hold up our advance, as follows:

- 199 siege battery, O 24 c.
 - 207 siege battery, O 30 a.
 - 129 heavy battery, O 24 c.
 - 122 heavy battery, O 30 a.
7. Acknowledge.

C. P. G. CAMERON,

Captain, R. A., Brigade Major Ninth Corps Heavy Artillery.

JUNE 6, 1917.

Copies to all recipients of Ninth Corps H. A. Order No. 39.

TELEPHONE AND TELEGRAPH COMMUNICATION.

RIGHT DIVISION ARTILLERY.

There will be a group of groups exchange at DA. Groups of battery exchanges at ES for "I" Group, DA for "J" Group, CF for "K" Group. "L" Group obtains its batteries direct for L1, L2, the others being on CF exchange.

There will be an O. P. exchange at LH to which all O. P.'s and battery exchanges will have direct lines. The batteries themselves will also have a junction line direct to LH, so that when they wish to obtain or change their O. P. they can call the O. P. exchange through the group of battery exchange and ask for their junction line to be plugged through to the observer desired.

Groups will have lines to the G of G at DA for C. R. A., intercommunication between themselves, liaison with infantry and heavy artillery; heavy T. M.'s will be connected to the O. P. exchange.

"I" GROUP.

Will have two lines to group of battery exchange at ES for talking to his batteries or sending messages, and three (one ringing and two buzzers) to DA, on which exchange his F. O. O.'s will be. Exchanges line between DA and ES will obtain an alternative means of communication between the group and either exchange.

The group will bury five pairs to AA, which will be taken on the bury via CC, two to ES, and three to DA exchange at PETITE MUNQUE.

Batteries.—Will bury two pairs direct to ES; one pair will be taken on ES exchange for a command line, the other will go direct in the bury to the O. P. test board at LH.

"J" GROUP.

Will have five lines, one ringer and four buzzers, direct to DA exchange, through which he will obtain all his communications. He will bury to "Y" box and pick up the bury via ES to DA.

Batteries.—Will pick up two pairs each in existing bury; one will go to DA exchange, the other will be taken direct to O. P. test board LH. The pairs which J3, J4, J5, and J6 will pick up bear a corresponding label.

"K" GROUP.

Will have two lines to his group of batteries exchange at CF, and three (one ringing, two buzzers) to DA. There will be exchange lines between CF and DA and the scheme of communications will be a duplicate of I group. K group will run five lines to test dugout at RC.

Batteries.—K1 will pick up two armored twins led out of bury opposite battery position; one of these pairs will go direct on the buried system to the O. P. exchange, the other to the battery exchange at CF.

K2, 3, and 4 will pick up six pairs led out of bury opposite K3 position; one for CF exchange, the other for LH test board.

K5 will pick up two pairs led out of the bury on a staked terminal board opposite battery position, one for CF, one for LH.

NOTE.—The pairs which K2, 3, and 4 will pick up bear a corresponding label.

"L" GROUP.

Will have six lines, three of which, one ringer and two buzzers, will go direct to DA and three to his batteries, two of which are direct on a party line, the other four on CF exchange, to which he will have two lines DA and CF being connected by exchange lines which afford an alternative route.

The six lines will be led into LS dugout at SUPPORT FARM.

Batteries.—L1 and 2 will bury to test box on LS-CR group two pairs each. A pair from each battery will be bunched at that point, and go direct in bury to the group H. Q. while the other pair from each will go direct in the bury to the O. P. test board at LH.

L3 and 4 bury two pairs each to CF, one of which goes in the bury to O. P. exchange, the other to group of batteries exchange board at CF.

L5 buries two pairs to DA and L6 to Z test box, one pair for O. P. exchange, the other going direct to group of batteries exchange at CF.

"M" DEFENSE GROUP.

Will have one line to G of G and one to the group on its left and right. This latter will also serve as the right lateral of the G of G exchange, who will obtain its communications through M group exchange. M group will also have a direct line to each battery. The O. P. exchange for this group will be at LS, where one line to

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 83

each of its five O. P.'s will be led in. There will also be a line between LS and M group headquarters.

Batteries.—Will bury two pairs each to SL—one will be put through direct to M group, the others will go on the O. P. exchange at LS.

O. P.'s U23, 25, 27 will be accommodated on existing buries. U26 must bury to LF, where it can pick up the bury to LS. C1 can be taken on the bury from DESPIERRE FARM DF.

Heavy trench mortars.—Will have each one pair to LH exchange. Two in U14 d, one in U14 b, two in U15 c, and one in U21 a will have pairs dropped out of the bury between BN and Y at the nearest point.

The TM at U14 b, 13.87, and that at U14 a, 57.70, will arrange their own line to BN, whence lines will be given them to LH.

O. P.'s post office, St. YVES, will be connected on bury to LH exchange. HUTTE CHATEAU buries to SN, thence by bury to LH exchange.

DA EXCHANGE.

	Number per unit.	Total.	Junctions not on exchange.	Exchanges.	
				Ring.	Buzzer.
LH exchange.....	5	5	.....	.....	5
ES exchange.....	2	2	.....	.....	2
CF exchange.....	2	2	.....	.....	2
PM exchange.....	1	1	.....	1	.....
"I" group.....	3	3	.....	1	2
"J" group.....	5	5	.....	1	4
"J" group batteries.....	1	6	.....	.....	6
"K" group.....	3	3	.....	.....	3
"L" group.....	3	3	.....	1	2
Division.....	1	1	.....	1	.....
C. R. A.....	3	3	.....	2	1
Brigades.....	1	3	.....	3	.....
Lateral G of G.'s.....	1	2	.....	2	.....
Covering CB group HA.....	1	1	.....	1	.....
K. B. S. (party with PM).....	1	1	1	.....	.....
F. O. O.'s.....	1	8	.....	.....	8
"M" group.....	2	2	.....	1	1
Railhead.....	1	1	.....	1	.....
Total.....	.....	.....	.....	.....	.....

84 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

LH EXCHANGE.

	Number per unit.	Total.	Junctions not on exchange.	Exchanges.	
				Rings.	Buzzer.
DA G of G exchange.....	5	5	.....	.....	5
CH and SH OP exchanges.....	1	2	.....	.....	2
ES and CF G of battery exchanges.....	2	4	.....	.....	4
"J" batteries.....	1	6	6	.....	.....
"J" batteries.....	1	6	6	.....	.....
"K" batteries.....	1	5	5	.....	.....
"L" batteries.....	1	6	6	.....	.....
Trench mortars.....	1	8	.....	.....	4
Observers.....	1	20	.....	.....	20
HA Fwd exchange PM.....	1	1	.....	.....	1

CF EXCHANGE.

DA exchange.....	2	2	.....	.....	2
LH exchange.....	2	2	.....	.....	2
"K" group.....	2	2	.....	.....	2
"L" group.....	2	2	.....	.....	2
"K" batteries.....	5	5	.....	.....	5
"L" batteries L3, 4, 5, and 6....	4	4	.....	.....	4
Total.....	.....	.....	.....	.....	17

ES EXCHANGE.

DA exchange.....	2	2	.....	.....	2
LH exchange.....	2	2	.....	.....	2
"J" group.....	2	2	.....	.....	2
"I" batteries.....	1	6	.....	.....	6

CENTER DIVISION ARTILLERY.

There will be a group of groups exchange at CG to which all groups and all batteries except those of "G" group will be connected, and through which communication with the infantry, other divisions, the heavy artillery, and F. O. O.'s can be obtained.

The command lines for the "G" batteries will be put through direct on the bury to "G" group.

There will be an O. P. exchange at SH to which all the O. P.'s will be connected, and all batteries will have lines to SH test board, so that when they wish to change their O. P. they can call the O. P. exchange through the group of groups exchange (or through the

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 85

group exchange in the case of "G" batteries) and ask for their junction line to be plugged through to the observer desired.

"G" group exchange will have two lines to SH exchange for this purpose.

"E" GROUP.

Buries five pairs to NC and picks up five pairs in bury to G of G.

E1, 2, 3, 4, and 6 bury to SQ and have one pair each in bury to CG G of G exchange, and one pair forward to O. P. exchange at SH.

E5 buries two pairs to SH, one forms the O. P. junction to SH the other pair picks up bury back to CG.

"F" GROUP.

Five locals to CG, four go on to G of G exchange, the fifth on the test board (spare).

F1 and 2 bury to PQ, two pairs each. One pair to SH, the other pair picks up bury back to CG.

F3, 4, and 5 bury two pairs to SM, and pick up bury one pair each to SH, and one pair each to CG exchange.

F6 buries two pairs to NT, one pair to SH in bury, one pair to CG exchange.

"G" GROUP.

Has four direct lines to its own exchange at PETITE MUNQUE and one ringing phone direct to G of G (CG).

"G" BATTERIES.

G1, 2, 3, 4, 5, 6, and 7 will bury each two pairs to LH; one of these will pick up the bury to PETITE MUNQUE and be put direct on line "G" group exchange, the other will pick up the bury to SH and serve as the junction line to SH.

"G" GROUP EXCHANGE.

	Number per unit.	Total.	Junctions not on exchange.	Exchanges.	
				Ring.	Buzzer.
"G" group.....	4	4	.....	.....	4
Batteries.....	7	7	.....	.....	7
F. O. O.'s.....	2	2	.....	.....	2
OP exchange SH.....	2	2	.....	.....	2
G of G exchange.....	1	1	.....	.....	1

86 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

"H" GROUP.

Buries five pairs to NC and thence on bury to CG four on exchange, one spare on test board.

H1, 2, and 3 bury two pairs to SQ, one pair picking up bury to CG the other to SH.

H4 buries two pairs to PQ, one to SH, the other on bury to CG exchange.

H5 and 6 bury two pairs each to SH and pick up one pair to CG exchange, the other to SH test board.

GROUP OF GROUP EXCHANGE CG.

	Number per unit.	Total.	Junctions not on exchange.	Exchanges.	
				Ring.	Buzzer.
To division.....	1	1	.....	1	.....
To CRA.....	3	3	.....	2	1
To brigades.....	1	3	.....	3	.....
To lateral to G of G.'s.....	1	2	.....	2	.....
To HA Fwd. exchange PM.....	1	1	.....	1	.....
Group "E".....	5	5	1	1	3
Group "F".....	5	5	1	1	3
Group "G".....	2	2	.....	1	1
Group "H".....	5	5	1	1	3
O. P. exchange SH.....	4	4	.....	.....	4
Batteries E, F, and H groups.....	1	18	.....	.....	18
F. O. O.'s E, F, and H groups.....	1	6	.....	.....	6
32d K. B. S.....	1	1	.....	.....	1
Covering H. A. CB group T.....	1	1	.....	1	.....
N. Y. R.....	1	1	.....	1	.....
DeKennebak railhead.....	1	1	.....	1	.....
Field dressing station.....	1	1	.....	1	.....
DAC (at N. P.).....	1	1	.....	1	.....
				18	40
O. P. exchange SH:					
G of G exchange CG.....	4	4	.....	.....	4
"G" group.....	1	1	.....	.....	1
Batteries E, F, G, and H groups.....	1	25	25	.....	.....
O. P. lines per observer.....	1	20	.....	.....	20
To LH, PM, and NYR.....	1	4	.....	.....	3
					28

LEFT DIVISION ARTILLERY.

Has combined G. of groups and O. P. exchange at L. G. to which batteries are connected for their forward lines, their back lines going direct to the groups.

A group.—Picks up special bury to LG (9 pairs):

A1 and 4 bury direct to ZR, two pairs each.

A3 and 5 pick up two pairs each in old bury to ZR.

A2 buries two pairs at dug-out on ZR-LG route (T3 central).

In each case one of the two pairs goes on to the exchange at LG. The other pair picks up the special bury to LG.

B group.—At DM has four pairs to LG on bury:

B1, 2, 3, and 4 bury two pairs direct to DM. One goes on exchange at group, the other picks up the bury to LG.

B5 (position uncertain) either buries direct as above or to test box at T3. Central in which it picks up one pair in bury to group and another pair to LG.

C group.—Picks up four of the 12 pairs of the CL-NE bury, which is looped into the office and uses them via CL to LG.

C1, 2, and 3 bury to group direct one pair each, and one pair each to LG.

C4 picks up old two pair bury to BB, thence in bury via AL, to LG and group one pair each.

C5 picks up old bury (GC3) two pairs to AL, one via NE to group, one via CG to G. of G.

D group.—Buries seven pairs to CL, thence via CL to G. of G.

D1 buries two pairs to ZR, where it picks up bury to LG, one pair stops at LG, the other goes on to the group.

D2 and 3 bury three pairs between them to test box at T3 central on ZR-LG route. Two of these are direct lines to LG exchange, the other a party line to the group through LG.

D4 buries to WM two pairs, one pair on bury to group, and the other to LG exchange.

D5 picks up special bury to CG, two pairs, one to LG, one to group.

NOTE.—At LG the lines to group from D4 and 5 are joined, and go on one line party working.

88 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

LG EXCHANGE.

	Number per group.	Total.	Exchanges.	
			Ring.	Buzzer.
Includes for G. of G. Exchange:				
Division.....	1	1	1	.....
C. R. A.....	3	3	2	1
Brigades.....	1	3	3	.....
Lateral to G. of G.'s.....	1	2	2	.....
H. A. forward exchange.....	1	1	1	.....
Groups PM.....	4	16	4	12
Covering C. B.-H. A. group.....	1	1	1	.....
K. B. S.....	1	1	.....	1
Dressing station.....	1	1	1	.....
DeKennebak railhead.....	1	1	1	.....
Includes for OP exchange LG:				
Batteries.....	1	20	.....	20
O. P.'s.....	1	14	.....	14
Cable heads.....	3	9	.....	9

¹ Per group 2 CRA and 2 F. O. O.

HEAVY ARTILLERY COMMUNICATIONS.

There will be two groups of heavies exchange, one for the northern batteries at EE and one for the southern batteries at LD.

In the southern area, LD, G of H exchange will have lines to Westhof, the groups and batteries, and lines to PM where there will be an O. P. exchange, having O. P.'s, trench observers, kite balloons, F. S. company, and batteries on its board.

In the northern area the G of H and the O. P. exchange will both be at EE.

BATTERIES.

Batteries, whether siege, C. B. or army, will have three lines, one direct to the group, one to the G of H exchange, and one a junction to the O. P. exchange. By the line to the G of H he can get either the group or the O. P. exchange. The junction to the O. P. exchange will be plugged through direct to the observer when required.

This line will be used whether the observer in question is in an O. P., a trench position, a kite balloon, or a sound ranger.

If it is desired to use sound ranging at the same time as direct observation the line to the G of H exchange can be used.

GROUPS.

Siege and army groups will have one direct to Westhof, one to each battery, and two to the G of H exchange; also a direct line to each of his F. O. O.'s.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 89

COUNTER-BATTERY GROUPS.

Will have, in addition to the above, a direct line to the C. B. S. O. and to the G of G exchange concerned; also to C. R. A. concerned.

Exchanges will be connected up as under:

Groups of heavies exchange:

2 lines to Westhof.

3 laterals to the other G of H.

2 lines to each group.

1 line to each battery.

3 lines to the O. P. exchange.

1 line each to K. B. S. and F. S. company.

O. P. exchange:

3 lines to the G of H exchange.

1 to K. B. S.

1 to F. S. company.

2 lines to the other O. P. exchange.

6 junctions to the other O. P. exchange.

Lines to Kemmel observers.

1 line to each O. P. observer.

Lines to trench observers.

1 junction to each battery.

In a few cases, owing to the relative positions of batteries and groups, it will be impossible to adhere to the above scheme, and the batteries will have two lines to the group and one to the O. P. exchange.

SOUTHERN AREA.

S counter-battery group, runs 13 pairs to CF test box:

2 lines to LD G of H exchange, 1 ringer, 1 buzzer.

1 line to WH, 1 ringer.

1 line to DA G of G exchange, 1 ringer.

1 line to C. B. S. O., 1 ringer.

1 line to RD 1 cable head, 1 buzzer.

1 line to RD 2 cable head, 1 buzzer.

1 line to each battery, 5 buzzers.

1 line to group on right, 1 ringer.

Total, 5 ringers, 8 buzzers.

S1, S3, run 3 pairs each to SF, one from each goes to LD G of H exchange, 1 to group, 1 to PM OP exchange.

S2, S4, pick up 6 pairs on CW route, 1 from each to LD, PM, and group.

S5, runs 3 pairs to WT, 1 to LD, 1 to group, 1 to PM.

90 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

V siege group, runs 10 pairs to LD:

1 to WH, 1 ringer.

2 to LD G of H exchange, 1 ringer, 1 buzzer.

1 to RD 1 cable head, 1 buzzer.

1 to RD 2 cable head, 1 buzzer.

1 to each battery, 5 buzzers.

Total, 2 ringers, 8 buzzers.

V1, V2, pick up 3 pairs each on DP route 1 to LD, 1 to group, 1 to PM OP exchange.

V3, runs 3 pairs to X box, 1 to LD, 1 to group, 1 to PM OP exchange.

V4, V5 runs 3 pairs to WT box, 1 to LD, 1 to group, 1 to PM OP exchange.

Y siege group, runs 10 pairs to LD:

1 to WH, 1 ringer.

2 to LD G of H exchange, 1 ringer, 1 buzzer.

1 to RD 1 cable head, 1 buzzer.

1 to RD 2 cable head, 1 buzzer.

5 to batteries, 5 buzzers.

Total, 2 ringers, 8 buzzers.

Y1, runs 3 pairs to WT, 1 for group, 1 for LD, 1 for PM.

Y2, runs 2 pairs to LD, 1 for LD, 1 for PM; 1 pair direct to group.

Y3, Y4, Y6 runs 3 pairs each to SF, 1 for group, 1 for LD, 1 for PM.

Y5, runs 3 pairs to C F, 1 for group, 1 for LD, 1 for PM.

NORTHERN AREA.

W siege group, runs 10 pairs to GB 7 test dugout:

1 for WH, 1 ringer.

2 for EE G of H exchange, 1 ringer, 1 buzzer.

1 for CD 1 cable head, 1 buzzer.

1 for CD 2 cable head, 1 buzzer.

5 for batteries, 5 buzzers.

Total, 2 ringers, 8 buzzers.

W1 runs 1 pair direct to group HQ. Runs 2 pairs to GB 7, 1 for EE G of H exchange, 1 for EE OP exchange. W2, W3 runs 3 pairs each to test box on LD-RC route, 1 for group, 1 for EE G of H exchange, 1 for PM.

W4, W6 runs to junction pl. T21a. and pick up bury to EE, 1 for group, 1 for EE G of H exchange, 1 for EE OP exchange. W5 runs 3 pairs to EE, 1 for group, 1 for EE G of H exchange, 1 for EE OP exchange.

T group picks up 10 pairs buried to EE; 2 pairs buried to junction pole T21a.

Back:

- 1 to WH, 1 ringer.
- 1 to C. B. S. O., 1 ringer.

Forward:

- 2 to EE G of H exchange, 1 ringer, 1 buzzer.
- 1 to CG G of G exchange, 1 ringer.
- 1 to CD 1 cable head, 1 buzzer.
- 1 to CD 2 cable head, 1 buzzer.
- 5 to batteries, 5 buzzers.

Total, 4 ringers, 8 buzzers.

T1 runs 3 pairs to PP, 1 on bury back to EF for EE G of H exchange (via EF); 1 on bury forward to EC for PM OP exchange; 1 on JP poled cable route, thence by EEJ via EE to group.

T2 runs 3 pairs to EC, 1 for EE G of H exchange via bury from PM; 1 for group via bury to LD, thence on poled cable to EE and bury to group headquarters; 1, if necessary, to PM OP exchange.

T3 runs 3 pairs to CF, 1 on bury to EE G of H exchange; 1 on bury via PM, LD, and thence by poled cable to EE and bury to group headquarters; 1, if necessary, to PM OP exchange.

T4 runs 3 pairs to NE, 2 for EE, 1 for group.

T5 runs 3 pairs to EE, 2 for EE, 1 for group.

X group runs 6 pairs to NP and picks up 3 pairs back and 2 pairs forward on NK-NP-NE bury; runs a staked route of 7 pairs to NE (which allows for 3 spares).

On bury to NK:

- 1 pair to WH, 1 ringer.
- 2 lines to X2, 2 buzzers.

On bury to NE, 2 lines to EE G of H exchange, 1 ringer, 1 buzzer.

On staked route to NE:

- 1 line to LD 3 cable head, 1 buzzer.
- 1 line to CD 1 cable head, 1 buzzer.
- 1 line to X4, 1 buzzer.
- 1 line to X6, 1 buzzer.

He gets X1 and X5 batteries direct, 2 buzzers.

Total, 2 ringers, 9 buzzers.

X1, X5 batteries run 2 pairs each to group direct and 1 to NE for OP exchange at EE.

X2 runs 3 pairs to A box on NK-NP bury, 2 of these stop at NP and go to group; the other goes on to NE and thence in bury to EE OP exchange.

X3 runs 3 pairs to NE, 1 for group, 2 for EE (via bury).

X4, X6, runs 3 pairs each to NE, 2 pairs to pick up staked route to group, 1 pair to EE OP exchange.

92 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Z group picks up 2 pairs dropped out of bury to Westhof; 1 line to corps HA, 1 ringer; 1 line to WH, 1 ringer; picks up 11 pairs dropped out of bury to EF; 2 lines to EE G of H exchange, 1 ringer, 1 buzzer; 2 lines to LD 3 cable head lines to batteries.

Z1 builds to XH 2 pairs; 1 line for EE OP exchange, 1 buzzer; 1 line for EE G of H exchange, 1 buzzer. He also builds 1 line direct to group.

Z2 builds 3 pairs to Y box: 1 to EE G of H exchange, 1 to EE OP exchange, 1 to group.

Z3 builds 2 pairs to Y box: 1 for EE G of H exchange, 1 for EE OP exchange. He also builds 1 pair to PP, thence by EFJ and special bury to group headquarters.

Z4 runs 1 line direct to Z group and picks up 2 pairs in special bury to EF, 1 for EE G of H exchange, 1 for EE OP exchange.

Z5 runs 3 pairs to LD: 1 via bury to group H. Q.; 2 via poled cable, 1 for EE G of H exchange, 1 for EE OP exchange.

Z6 runs 3 pairs to DC, whence 2 pairs are taken directly to U group on the bury and 1 pair to EE OP exchange.

Z7 uses 3 pairs of EFJ route: 1 to T group on bury from EF, 1 to EE G of H exchange, 1 to EE OP exchange.

Z8 runs 3 pairs to EF: 1 in special bury to group H. Q., 1 on bury to EE G of H exchange, 1 on bury to EE OP exchange.

Z9, same as Z4.

U group (C. B.) runs 17 pairs to XH test board:

1 pair WH on RCL route, 1 ringer.

1 pair EE G of H exchange, 1 ringer.

1 pair EE OP exchange, 1 buzzer.

2 pairs LD 2 cable head, 2 buzzers.

1 pair LG G of G exchange, 1 ringer.

9 pairs to batteries, 9 buzzers.

1 pair C. B. S. O. on RCL route, 1 ringer.

1 pair R group lateral on RCL route, 1 ringer.

Total, 5 ringers, 12 buzzers.

U1 runs 3 pairs to NE, thence by bury, 1 pair to group headquarters, 1 pair to EE G of H exchange, 1 pair to EE OP exchange.

U2 runs 3 pairs to DC, thence in bury, 2 pairs to U group, 1 pair to EE OP exchange.

U3, 4, 5 run to CL, thence in bury, 2 pairs to U group, 1 pair to EE OP exchange.

R group, 20-pair route to be built to junction of WCJ and RCL routes, 1 pair WH via WCJ route; 2 pairs to EE G of H exchange, RCL route; 1 pair to LD 1; 1 pair to U group; 1 lateral to left corps

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 93

group, WCJ route; 6 pairs to batteries, WCJ route; 4 pairs to batteries, RCL-XHCL bury.

R1, 5 run 3 pairs each to XH, 2 pairs each to group, RCL route; 1 pair each to EE OP exchange, XHCL.

R2, 3, 6 run 3 pairs to A box on NK NP route, 2 via Westhof and WCJ route to group, 1 pair via NE to EE OP exchange.

R4 runs 3 pairs to CL, 2 to group on bury and RCL route, 1 to EE OP exchange via NE.

LD G OF H EXCHANGE.

	Number per unit.	Total.	Junctions not on exchange.	Exchange.	
				Ring.	Buzzer.
HA exchange Westhof.....	3	3	.....	3	.....
Lateral to EE G of H exchange.	3	3	.....	3	.....
"S" "V" and "Y" groups.....	2	6	.....	3	3
No. 9 K. B. S. Nieppe.....	1	1	.....	1	.....
Field survey company.....			.....		1
O. P. exchange PM.....	3	3	.....		3
Batteries "S" "V" and "Y" groups.....	1	16	.....		16
Requirements: 3 exchange panels; 3 4-line ringers.					
Total.....				10	23

OP EXCHANGE PM.

G of H exchange LD.....	3	3	.....	.....	3
"EE" OP exchange.....	2	2	.....	.....	2
Junctions to EE OP exchange..	6	6	6	.....	.....
Batteries.....	1	21	21	.....	.....
Observers Hill 63, 2 per group S, V, Y.....	1	6	.....	.....	6
Kemmel O. P's.....	2	2	.....	.....	2
Trench observers.....	(?)	(?)	.....	.....	? 10
9 K. B. S. Nieppe (party line with DA).....	1	1	.....	.....	1
Field survey company.....	1	1	.....	.....	1
SH OP exchange.....	1	1	.....	.....	1
LH OP exchange.....	1	1	.....	.....	1
Requirements: Plug panels, 2 receiver panels, 1 exchange panel.					
Total.....			27	.....	27

[Nomenclature for P and S exchange posts: Plug panel—2 plugs and terminals, 16 to a panel for battery junctions. Receiver panel 2—Receivers, sockets, and terminals for O. P.'s. exchange panel 2—Receivers, sockets, terminals, plugs and cords to be used horizontally for short-speaking circuits.]

94 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

"EE" G OF H EXCHANGE.

	Number per unit.	Total.	Junctions not on exchange.	Exchange.	
				Ring.	Buzzer.
H. A. exchange Westhof.....	3	3	.....	3	.....
Lateral to LD G of H exchange.	3	3	.....	3	.....
25 K. B. S. Ravelsburg.....	1	1	.....	1	.....
32 K. B. S. DeBroken.....	1	1	.....	1	.....
Field survey company.....	1	1	.....	1	.....
T, W, X, Z, R, and U groups.....	2	12	.....	6	6
O. P. exchange EE.....	5	5	4	.....	1
Batteries.....	1 or 2	.....	.....	.....	24
GG exchange.....	1	1	.....	1	.....
Requirements: 4 exchange panels, 44-line ringers.	.....	.....	.....	.....	.....
Total.....	.....	.....	.....	16	31

EE O. P. EXCHANGE.

	Number per unit.	Total.	Junctions not on exchange.	Exchange.	
				Ring.	Buzzer.
25 K. B. S. Ravelsburg.....	1	1	.....	.....	1
32 K. B. S. DeBroken.....	1	1	.....	.....	1
Field survey company.....	.....	.....	.....	.....	.....
PM OP exchange.....	2	2	.....	.....	2
PM OP exchange junctions.....	6	6	6	.....	.....
Kemmel O. P.'s.....	1	4	.....	.....	4
Hill 63 OP.'s.....	1	12	.....	.....	12
Batteries.....	1	32	32	.....	.....
Trench observers.....	1	10	.....	.....	10
SH exchange.....	1	1	.....	.....	1
EE G of H exchange.....	5	5	4	.....	1
Requirements: 2 plug panels, 3 receiver panels, 1 exchange panel, 1 socket panel.	.....	.....	.....	.....	.....
Total.....	.....	.....	.....	.....	32

EXAMPLE OF RFPORIS.

Record of Artillery work, No. 53 Squadron Royal Flying Corps.

Date, 18/5/17.

Battery.	Position call.	Target	Remarks.
82d Siege.....	FF 13	O 29 b 10.80 to 00.95...	(1) Not attempted.
236th Siege.....	FF 29	O 27 c 93.00.....	(2) Successful. 4 OK's, 3 Y's, 5 Z's, and a large number of A's. 6 MOK's and several MZ, MY, MA. Second pit from the north appears to be damaged badly and the whole position considerably knocked about.
279th Siege.....	FF 37	O 22 a 13.64.....	(3) Not attempted.
185th Siege.....	FL 11	O 29 c 20.85.....	(4) Successful. Corrections during registration 2 OK's, 1 Z, 6 A's, several B's and C's. Corrections during BF 3 A's, 3 B's, 2 MB's, 2 MA's. Both gun pits appear to be hit.
275th Siege.....	FH 24	O 27 b 95.10.....	(5) Not attempted.
185th Siege (N. Section).	.....	O 25 b 07.84 (dugout)..	(6) Successful. 1 OK, 1 Y, 6 Z's. About 22 rounds observed.
405th Siege.....	.....	Ochre Trench, O 26 c 11.42 to 05.55.	(7) Successful. About 60 rounds observed. 2 OK's, 2 Y's, 8 Z's. Battery shooting well when machine left. Several rounds fell very close to trench, one causing a fire, smoke of which lasted 10 minutes.
285th Siege.....	.....	Occult Trench, O 25 c 24.27 to 49.05.	(8) Successful. 6 B's, 13 A's, 2 Z's, 1 Y, 1 OK, 4 MB's, 3 MA's, 2 MZ's, 1 MY, 3 MOK's.
301st Siege.....	.....	M. G. Emplacements, O 19 c 90.54, O 19 c 78.82, O 19 d 36.63, O 19 d 40.35.	(9) Successful. On all four pin-points many Y's, Z's, A's, and B's sent down. OK's were also observed on all targets.
173d Brigade...	.....	N 24 d 53.27.....	(10) Ranging partially successful, several A's observed, but not possible to say if actual wire-cutting was successful. Other batteries were firing near, making observations difficult.

96 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

ZONE CALLS.

Time: Between 1.55 and 4.15 p. m.

Position: O 28 d 1.6.

Result: Answered.

G. F. WILSON, *Lieutenant,*

For Major, Commanding No. 53 Squadron, R. F. C.

FIFTH BALLOON COMPANY, R. F. C.

POINTS OF INTEREST.

1-6-1917.

No. 2 section:

Number of ascents.....	4
Number of observers taken up.....	8
Number of targets successfully engaged.....	3

No. 25 section:

Number of ascents.....	4
Number of observers taken up.....	8
Number of targets successfully engaged.....	6

No. 2 section: Visibility very moderate and greatly interfered with shots.

No. 25 section: Observation interrupted by patchiness of view.

Time in air: No. 2 section, 7 hours and 50 minutes; No. 25 section, 9 hours and 48 minutes.

Total time in air: 17 hours and 38 minutes.

A. McCRAE WILSON, *Lieutenant,*

For Major, O. C. Fifth Balloon Company, R. F. C.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 97

No. 2 balloon section record book.

Time.	Observers.	Observed.	Remarks.
31-5-17.			
6 to 6.10 p. m.	2d Lieut. Barnes and 2d Lieut. Lamb (height, 3,700 feet).	.....	Continued from 3.05 p. m.
6.15 to 9.30 p. m.	Lieut. Lucas and 2d Lieut. Gibbs (height, 4,200 feet).	28/O 22a 30.20 (Polka Estaminet). 28/O 20 b 43.87 (leg copse). 28/O 23 a 10.90 (smoke). 28/O 15 d 25.60, 28/O 22 d 59.89, 28/O 22 b 75.49, 28/O 16 d 03.68 (hostile batteries active).	Shoot with North Midland Heavy Battery (60-pounders. 30 rounds fired, 5 guns registered). Shoot with A/180 Brigade (18-pounders). 50 rounds fired, 1 gun registered. Messages sent to C. B. S. O., Ninth Corps: At 6.58 p. m. "Large explosion at considerable distance E. of Comines;" at 8.35 p. m. "Smoke cloud in 28/O 25 a 10.90;" at 9.17 p. m. "Hostile batteries active in 28/O 15 d 25.60, 28/O 22 d 59.89, and 28/O 22 b 75.49;" at 9.17 p. m. "Hostile battery in 28/O 16 d 03.68 active."
1-6-17.			
1.25 to 4.50 p. m.	2d Lieut. Culverwell and 2d Lieut. Gibbs (height, 3,600 feet).	28/O 15 a 30.10 (crossroads). 28/O 26 c 85.70 to 28/O 25 d 98.10 (Skip Wood). 28/O 15 a 30.10 (Crossroads).	Shoot with D/180 Brigade (4.5-inch howitzer), 3 rounds fired, when shoot was postponed owing to bad light. Shoot with 185th Siege Battery (9.2-inch howitzer), bombardment shoot, 4 guns registered, 200 rounds fired, very good shooting reported. Continuation of postponed shoot with D/180 Brigade (4.5-inch howitzer), 10 more rounds fired on this target, when it was finally abandoned owing to bad visibility.
4.55 to 5.35 p. m.	2d Lieut Barnes and 2d Lieut. Lamb (height, 4,000 feet).	28/O 26 d 10.70 (Lumm Farm).	Shoot with D/180 Brigade (4.5-inch howitzer), 10 rounds fired, then the balloon had to haul down to change observers, in connection with operations at 6 p. m.
5.40 to 6 p. m.	Maj. Stringer and Lieut. Lucas (height, 4,000 feet).	.....

Balloon still in air. Will be continued in to-morrow's report.

T. THORNTON,

Lieut., O. C. No. 2, Balloon Section, R. F. C.

98 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

No. 25 balloon section record book, 1-6-1917.

[Continued from last night.]

Time.	Observers.	Observed.	Time.	Remarks.
31-5-17.				
6 to 6.41 p. m.	2d Lieut. Wilkie and 2d Lieut. B a g r a m (height, 3,600 feet).	28/O 27 b 30.99 (hostile battery position).	6 to 8.27 p. m.	Continuation of shoot with 59th Siege Battery referred to in last night's report. Further 288 rounds fired, 11 "believed targets."
6.46 to 9.20 p. m.	Capt. Lee and 2d Lieut. Goodman (height, 2,800 feet).	28/N 30 b 20.30 (wire).	8.27 p. m..	General observations on 50 rounds given to C/153.
1-6-15.				
10.48 to 11.22 a. m.	2d Lieut. Bagram, and 2d Lieut. Ha-worth (height 3,450 feet).	.....	.....	Too hazy for shooting.
11.59 to 3.45 p. m.	2d Lieut. Bagram.	28/O 27 d 34.60 (hostile battery position).	12.49 p. m.	Shoot commenced with 59th Siege Battery; 100 rounds fired; 5 "believed targets."
	2d Lieut. Ha-worth (height, 3,800 feet).	28/O 25 b 78.35 (trench point).	2.16 p. m..	Shoot with 301 Siege Battery on wire; general observations given on 100 rounds; 1 explosion caused.
		28/O 25 b 86.15 (trench point).	3 p. m.....	Shoot with 301 Siege Battery on wire; general observations given on 100 rounds.
1-6-17.				
3.47 to 6 p. m.	Capt. Lee.....	28/N 30 b 20.30 (trench point).	4.20 p. m..	Shoot commenced with C/153 on wire; 114 rounds fired.
	2d Lieut. Wilkie (height, 3,700 feet).	28/O .33 b 43.48 (hostile battery position).	5.39 p. m..	Shoot with 120 Siege Battery; general observations given; 9 rounds fired; shoot proceeding.

Balloon still in air. Will be continued in to-morrow's report.

C. BAGRAM,

Second Lieut. (for Captain, O. C. No. 25, Balloon Section, R. F. C.).

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 99

NINTH CORPS HEAVY ARTILLERY.

Weekly operation report.

[6-0 a. m. 3-5-17 to 6-0 a. m. 10-5-17.]

3-5-17. In support of operations by the Tenth Corps, the following bombardments were carried out:

AMMUNITION EXPENDED.

Objective:

The DAMMSTRASSE (O 4 c, O 9 b c, O 8 d)—	Rounds.
6-inch howitzer.....	855
Trench area round O 8 d 6.3—	
6-inch howitzer.....	38

6-5-17. Three two-minute bursts of fire by 12 howitzer batteries were directed on the points O 20 d 20.30, O 19 b 30.00, O 14 c 50.70:

Ammunition expended:	Rounds.
9.2-inch howitzer.....	20
8-inch howitzer.....	24
6-inch howitzer.....	255

7-5-17. Two five-minute bursts of fire were carried out by all guns and howitzers as under:

AMMUNITION EXPENDED.

Objective:

WYTSCHAETE (O 19 d)—	Rounds.
9.2-inch howitzer.....	57
8-inch howitzer.....	71
Billets in O 15 c, O 22 d, O 23 d, O 24 a, O 26 b, O 30 b—	
6-inch howitzer.....	457
Roads in O 14 d, O 15 a, O 16 d, O 22 b, O 23 a, O 27 d, O 28 a, O 29 a b—	
60-pounder.....	440

8-5-17. In response to a call for assistance, owing to heavy shelling of our trenches in N 36, fire was opened in accordance with local bombardment scheme "KRUISSTRAAT."

9-5-17. A call for assistance was received from the Sixteenth Divisional Artillery, who reported an intense bombardment of our trenches in O 7. Fire was immediately opened in accordance with local bombardment scheme "BOIS QUARANTE," 60-pounders and one 6-inch howitzer battery being detailed for counter-battery work.

During the week nine registrations and three calibrations have been satisfactorily carried out. Three zone calls on mechanical transport have been taken up.

C. P. P. CAMERON,

Captain, R. A., Brigade Major Ninth Corps Heavy Artillery.

MAY 10, 1917.

100 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Weekly intelligence of hostile batteries active during week ending May 9, 1917, and "K" list for week ending May 16, 1917.

KNOWN POSITIONS OBSERVED ACTIVE.

Number.	Position.	Caliber.	Date active.	Area shelled.
O. W. 11...	O 15 a 90.05	7.7 cm G	6	N 5 or N 6.
	U 15 b 05.40	7.7 cm G	5, 8	(?)
O. W. 15...	O 15 c 75.25	7.7 cm G	2	N 12 d.
O. W. 18...	O 15 d 80.95	7.7 cm G	6	(?)
	O 16 a 70.90	(?)H	7	N 10.
	O 16 c 13.65	(?)H	2, 3, 6, 7	N. W., direction of H 33.
O. X. 2...	O 16 c 20.60	7.7 cm G	6	I 31.
O. X. 6...	O 16 c 20.90	(?)H	5, 6, 7	N. W., N 3, H 33.
O. X. 4...	O 16 c 80.45	7.7 cm G	6	N 10.
	O 16 d 60.05	10.0 cm G	6, 7	N 20.
O. Y. 2...	O 20 b 70.10	7.7 cm G	6	N 21.
O. Y. 9...	O 20 d 90.55	7.7 cm G	4, 5	N 29, direction of N 21.
O. Y. 5...	O 21 a 95.20	10.0 cm H	2, 3, 6, 8	N 12 d, N 10.0 7 a T.
O. Y. 43...	O 21 a 40.40	7.7 cm G	2, 5, 8	N 11, N 12, 0 7 a T, direction of N 15.
O. Y. 14...	O 21 c 30.70	7.7 cm G	2	N 21.
O. Z. 41...	O 22 a 16.34	15.0 cm G	3	(?)
O. Z. 65...	O 22 a 58.48	10.0 cm G	5	N. W.
O. Z. 2...	O 22 b 71.72	10.5 cm H	7	Direction of H 33.
O. Z. 43...	O 22 c 58.94	15.0 cm G	2, 3, 5, 6, 7	N. W., direction of N 11, N 21, N 15.
O. Z. 32...	O 22 c 75.70	15.0 cm H	7	(?)
O. Z. 4...	O 22 c 85.15	10.0 cm G	7	H 28.
O. Z. 40...	O 23 a 85.10	10.0 cm G	7	N. W.
O. Z. 62...	O 23 c 95.90	10.0 cm G	3, 4, 6, 7, 8	N. W., N 21, H 34, direction of N 10.
O. Y. 23...	O 27 a 35.05	10.5 cm H	7	H 28.
O. Y. 22...	O 27 a 12.98	7.7 cm G	2	N 23.
O. Y. 24...	O 27 b 20.30	10.5 cm H	2, 3, 5, 6, 7	N 35, N 29, N 32, N 33, N 27.
	O 27 b 98.32	10.5 cm H	2	N 35.
O. Y. 35...	O 27 b 05.55	7.7 cm G	8	O 7 b T.
O. Y. 28...	O 27 b 60.20	10.5 cm H	2, 4, 7	N 35 b.
O. Y. 45...	O 27 d 65.00	7.7 cm G	2	T 5.
O. Y. 29...	O 27 d 70.30	15.0 cm G	4	S. W.
O. Z. 9...	O 28 c 20.30	10.0 cm G	4	S. W.
O. Z. 45...	O 28 c 62.25	10.0 cm G	6	T 16.
O. Z. 26...	O 28 d 10.55	15.0 cm H	2, 3, 4, 7	N 32, N 33.
O. Z. 37...	O 29 a 46.38	15.0 cm H	7	N 20.
O. Z. 11...	O 29 a 05.40	15.0 cm H	7	N 20.
O. Z. 12...	O 29 b 05.85	15.0 cm G	2, 7	N 19, N 33.
	O 20 b 00.93	15.0 cm G	6	N 33.

SUSPECTED NEW POSITIONS.

	O 16 c 64.46	7.7 cm G	6	(?)
	O 23 b 27.88	(?)15.0 cm G	7	H 34.
	P 26 a 70.50	(?)21.0 cm G	7	North.

2d Lieut. I. O. H. A. Ninth Corps.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 101

HEADQUARTERS
SECOND ARMY A. A. GROUP,
Thursday, May 31, 1917.

Shooting Report.

PRECIS.

Number of planes engaged.....	22
Number which came well over lines.....	6
Time of greatest activity.....	3-9.22 p. m.
Total planes seen.....	34
Total rounds fired.....	898

Weather.—Fine. Overcast in morning, becoming clearer. Visibility fair.

Remarks.—At 7.30 p. m. an Albatros Scout was crashed over WARNETON by F. E. 2d. The two fighters which strafed the balloon at 9.10 p. m. came from HOUPINES to NIEPPE without using their engines. The engines were not heard to start until just before the attack.

DETAIL.

		Rounds fired.
3.00-3.12 p. m.	Reconnaissance, Height 10,000, Warneton-Neuve Eglise-Ploegsteert-Warneton.....	103
4.08-5.48 p. m.	Reconnaissance, height 12,000, Frelinghein-Nieppe-Perenchies-Frelinghien (followed this course twice and was engaged by Nieuport).....	68
5.15-6.15 p. m.	7 fighters, height 7,000, Piikem-Hooge-Warneton.....	78
6.55-6.59 p. m.	Reconnaissance, height 12,000, Warneton-Ploegsteert Wood-Warneton.....	34
7.10-7.15 p. m.	Artillery, height 6,000, Piikem-St. Julien.	20
7.18-7.30 p. m.	Reconnaissance, height 11,000, Estaires-Steenwerck - Bailleul - Westoutre - Ren-ingeelst-Vlamertinghe-Piikem.....	315
8.09-8.51 p. m.	6 fighters, height 10,000, Frelinghien-Warneton.....	36
8.15-9.22 p. m.	Artillery, height 9,000, Warneton-Neuve Eglise-Messines.....	117
9.05-9.10 p. m.	Reconnaissance, height 75,000, Wyschaete-Vierstraat-Wyschaete.....	68
9.07-9.15 p. m.	2 fighters, height 9,000-3,000, Perenchies-Houplines-Nieppe (one attacked and set fire to balloon)-Armentieres-Perenchies.....	59

Twelve other hostile machines were seen well behind enemy lines.

102 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

NINTH CORPS WEEKLY COUNTER-BATTERY REPORT, WEEK ENDING MAY 30, 1917.

Hostile artillery activity, 44 hostile batteries definitely active.

Nature.		This week.	Last week.	Two weeks ago.
Field.	7.7 cm. G.....	18	23	10
	8.8 cm. G.....	1	11	14
	10.5 cm. G.....	13	80%	55%
	Composite.....	..	..	..
Heavy	10.0 cm. G.....	2	(?)	6
	50.0 cm. G.....	4	1	9
	15.0 cm. H.....	6	6	3
	21.0 cm. G.....	..	..	1
	Composite.....	..	..	..
Total (all calibers).....		44	42	43

14 suspected new positions:

Nature—	Number.
7.7 cm. G.....	4
10.5 cm. H.....	2
10.0 cm. G.....	1
13.0 cm. G.....	1
15.0 cm. G.....	2
H. V. G.....	2
Doubtful.....	2

Principal features.—(1) The enemy has been quiet during the day-time throughout the week.

(2) Short bursts of fire more usual than prolonged shelling.

(3) No hostile counter-battery work this week till the 27th. Since then all shelling of batteries reported has been at night, with one exception.

(4) The shelling of back areas throughout the night by new high-velocity guns. Rounds have been spread over widely separated targets.

(5) Use of gas shell on several occasions.

(6) Much increased use of smoke screens, especially at night, when they are very effective.

(7) Reoccupation of old positions by field batteries—notably in O 27 a and b.

(8) Number of batteries active remain almost normal, for many of the new positions may be accounted for by the number of batteries silent since bombardment.

Hostile counter-battery work.—286 (S) Battery H has been shelled twice during the week; 151 (S), 129 (S), 278 (S), and N. R. Heavy were each shelled once during the week.

SHOOTS WITH BALLOON OBSERVATION.

Date.	Caliber.	Number.	Position.	Engaged by—	Nature.	Rounds.	Remarks.
24-5-17	77 G	.....	O 27 b 21.35	120 (S)	<i>Inches.</i>	200	Successful; 11 rounds reported believed target.
	77 G	.....	O 15 c 25.60	266 (S)	8	200	Successful; very good shooting.
	77 G	O Y 31	O 27 a 51.61	266 (S)	6	150	Successful; observation during latter part of shoot impossible.
27-5-17	77 G	O W 18	O 15 d 82.98	236 (S)	6	400	Successful.

SHOOTS WITH AEROPLANE OBSERVATION.

24-5-17	77 G	.....	O 27 b 05.55	236 (S)	6	300	Successful; direct hit on No. 3 pit causing large explosion and fire. No. 2 pit destroyed; other pits badly damaged.
	150 G	.....	O 29 b 10.80	82 (S)	12	25	Successful; large upheaval caused by direct hit on gun pit; shooting very accurate.
	H	.....	O 28 b 18.90	48 (S)	9.2	150	Successful; 2 gun pits hit and position badly knocked about.
	H	.....	O 22 c 85.15	59 (S)	6	200	Successful; both batteries ranged and fire continued for effect; position badly damaged and several direct hits on southern pit.
	105 H	.....	O 27 a 37.95	279 (S)	6	150	Successful; 2 O K's, 2 Y's during ranging; battery well on to target when C I given; continued with balloon.
	77 G	.....	O 21 a 38.40	126 (S)	8	120	Successful; 1 gun pit hit.
	105 H	.....	O 16 a 82.65	161 (S)	9.2	160	Successful; battery in action at commencement of shoot; 3 pits hit; 2 explosions and a fire in one pit.
25-5-17	150 H	.....	O 22 a 27.19	279 (S)	6	200	Successful; combined shoot; 1 small explosion observed.
	H	.....	O 28 a 91.86	59 (S)	6	200	Successful; observation continued by balloon.
	H	.....	O 28 b 39.05	48 (S)	8	140	Unsuccessful; considerable jamming of signals prevented the shoot being continued.
	105 H	.....	O 16 c 16.63	236 (S)	6	300	Successful; both pits hit and much damage done.
	150 G	.....	O 29 b 10.80	82 (S)	12	25	Successful; 1 pit knocked out.

SHOTS WITH AEROPLANE OBSERVATION—Continued.

Date.	Caliber.	Number.	Position.	Engaged by—	Nature.	Rounds.	Remarks.
26-5-17	150 G	O Z 87	O 23 c 95.00	279 (S)	Inches: 6	200	Successful; both batteries got right on position which is considerably damaged. Successful; 1 gun pit hit. Successful; an explosion seen in 1 gun pit and second pit also hit; 1 shot fell on what appears to be a small dugout in hedge and caused small explosion. Successful registration only; poor visibility. Successful; 1 gun pit damaged. Successful; 2 southern pits completely wrecked and No. 2 pit set on fire; good shooting. Successful; 1 gun pit hit. Successful; 4 gun pits hit. Successful; 2 gun pits demolished and 1 explosion observed. Unsuccessful; rounds mostly unobserved owing to delay action fuzes being used; no registration. Successful; 1 gun pit damaged. Successful; 2 gun pits hit and 1 dugout destroyed. Successful. Successful; 1 gun pit knocked out. Successful; 1 O. K. completely wrecked a gun pit and another shot hit a dugout; carried on by balloon. Successful; southern gun pit completely wrecked and second from south badly damaged; carried on by balloon. Successful; 6 O. K's; southern gun pit hit four times; carried on by balloon. Successful; shooting of both batteries accurate. Successful; 2 southern gun pits knocked out; explosion occurred in rear of target in A circle Calibration.
	105 H	O Y 8	O 21 c 38.70	303 (S)	..... 6	200
	150 G	O Z 41	O 22 a 19.33	126 (S) 161 (S)	9.2	200 180	
27-5-17	150 H	O Z 123	O 28 b 39.05	263 (S)	6	100	Successful; 1 gun pit hit. Successful; 2 southern pits completely wrecked and No. 2 pit set on fire; good shooting. Successful; 1 gun pit hit. Successful; 4 gun pits hit. Successful; 2 gun pits demolished and 1 explosion observed. Unsuccessful; rounds mostly unobserved owing to delay action fuzes being used; no registration. Successful; 1 gun pit damaged. Successful; 2 gun pits hit and 1 dugout destroyed. Successful. Successful; 1 gun pit knocked out. Successful; 1 O. K. completely wrecked a gun pit and another shot hit a dugout; carried on by balloon. Successful; southern gun pit completely wrecked and second from south badly damaged; carried on by balloon. Successful; 6 O. K's; southern gun pit hit four times; carried on by balloon. Successful; shooting of both batteries accurate. Successful; 2 southern gun pits knocked out; explosion occurred in rear of target in A circle Calibration.
	150 G	O Z 12	O 29 b 00.95	82 (S)	12	25	
	105 H	O Y 28	O 27 b 67.10	120 (S)	8	182	
	150 H	O Z 35	O 28 d 29.67	48 (S)	9.2	200	
	77 G	O W 27	O 15 d 46.73	59 (S)	6	400	
	77 G	O Z 123	O 28 b 39.05	48 (S)	9.2	160	
28-5-17	77 G	O X 5	O 16 d 03.68	279 (S)	6	72	Successful; 1 gun pit hit and 1 dugout destroyed. Successful. Successful; 1 gun pit knocked out. Successful; 1 O. K. completely wrecked a gun pit and another shot hit a dugout; carried on by balloon. Successful; southern gun pit completely wrecked and second from south badly damaged; carried on by balloon. Successful; 6 O. K's; southern gun pit hit four times; carried on by balloon. Successful; shooting of both batteries accurate. Successful; 2 southern gun pits knocked out; explosion occurred in rear of target in A circle Calibration.
	77 G	O X 4	O 16 a 82.42	266 (S)	6	260	
	77 G	O Y 20	O 27 a 70.50	126 (S)	8	200	
	77 G	O Y 14	O 21 c 38.70	161 (S)	9.2	160	
	105 H	O X 56	O 16 a 68.91	303 (S)	6	300	
	77 G	O Y 2	O 20 b 72.14	120 (S)	8	200	
28-5-17	150 H	O Z	O 34 b 33.99	82 (S)	112	50	Successful; 1 gun pit hit and 1 dugout destroyed. Successful. Successful; 1 gun pit knocked out. Successful; 1 O. K. completely wrecked a gun pit and another shot hit a dugout; carried on by balloon. Successful; southern gun pit completely wrecked and second from south badly damaged; carried on by balloon. Successful; 6 O. K's; southern gun pit hit four times; carried on by balloon. Successful; shooting of both batteries accurate. Successful; 2 southern gun pits knocked out; explosion occurred in rear of target in A circle Calibration.
	105 H	O Z 65	O 22 a 57.49	48 (S)	9.2	220	
	77 G	O X 5	O 16 d 05.55	59 (S)	6	400	
	105 H	O Y 25	O 27 a 99.83	303 (S)	6	200	
	105 H	O Z 126	O 28 c 75.45	161 (S)	9.2	200	
	150 H	O Z 37	O 29 a 50.33	58 (S)	16	16	

30-5-17	(T)	O X 52	O 16 b 20.07	279 (S)	6	200	{ Successful; combined shoot; 3 direct hits on 1 gun pit and 2 on another; 1 pit set on fire. Successful; combined shoot. Successful; combined shoot; 2 O. K's with 303 (S); many M. O. K's observed. Successful; 3 O. K's 7 M. O. K's, No. 1 and No. 4 pit seen to catch fire and No. 3 believed to be hit.
	150 G (T)	.....	O 30 a 42.37	236 (S)	8	200
	77 G	O X 7	O 16 d 60.07	120 (S)	6	150	
		O Z 70	O 22 a 09.48	279 (S)	9.2	200	
				303 (S)		250	
				161 (S)		160	

* M. K. VII,

† Railway,

SHOOTSCARRIED OUT WITHOUT OBSERVATION; DATUM POINTS USED WHEN POSSIBLE.

29-5-17	77 G	O Y 35	O 27 b 02.59	236 (S)	6	200	{ Combined shoot. Combined shoot. Datum points used. Datum point used.
	105 H	O Y 5	O 21 a 06.21	266 (S)	8	100	
	77 G	O Y 70	O 27 b 34.18	120 (S)	6	200	
	77 G	O W 19	O 15 d 94.44	59 (S)	6	400	
	150 H	O Z 37	O 29 a 42.35	279 (S)	6	200	
30-5-17	77 G	O Y 47	O 27 a 24.62	303 (S)	8	200	
	105 H	O Y 5	O 22 d 05.05	126 (S)	6	400	
		O Y 64	O 21 a 05.21	59 (S)	8	200	
			O 21 a 27.60	236 (S)	6	300	
				236 (S)	6	250	

104 hostile batteries were engaged with neutralizing fire by our 6-inch howitzers and 60-pounders.

15 zone calls have been received and engaged.

General intelligence.—Ranging: Hostile planes were up early on the 25th, 26th, 27th, and 28th, but they seem to have done very little work in the corps area. Visibility: Observation has been alternately good and "fair to poor."

H. C. WILKINSON
Lieutenant Colonel, Counter-Battery Staff Officer Ninth Corps, R. A.

106 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

NINTH CORPS HEAVY ARTILLERY.

*Weekly intelligence of hostile batteries active during week ending May 30,
and "K" list for week ending June 5, 1917.*

KNOWN POSITIONS OBSERVED ACTIVE.

Number.	Position.	Caliber.	Dates active.	Area shelled.
O W 19...	O 15 d 94.44	105 H	27, 28	N 33.
O X 10...	O 16 a 82.65	105 H	23	(?)
O X 55...	O 16 a 68.91	105 H	23	(?)
O X 52...	O 16 b 21.07	H	27	N 14 (?)
O X 6...	O 16 c 21.98	(?) H	24	(?)
O X 4...	O 16 c 82.45	77 G	25, 26, 27	North.
O X 5...	O 16 d 03.68	77 G	26	North.
O X 7...	O 16 d 60.07	77 G	28	N. W.
O Y 62...	(?) O 20 a 90.88	88 G	26	(?)
O Y 61...	O 20 a 84.53	77 G	26	Over H 36.
O Y 2...	O 20 b 72.14	77 G	24	N 36.
O Y 5...	O 21 a 96.21	105 H	27	(?)
O Z 36...	O 22 a 27.19	77 G	23	N 21.
O Z 41...	O 22 a 19.33	150 G	23	(?)
O Z 65...	O 22 a 57.49	(?) H	26	(?)
O Z 70...	(?) O 22 a 09.48	(?) H	27	(?)
O Z 4...	O 22 c 84.10	150 H	23, 28	(?) N 22.
O Z 87...	O 23 c 95.00	100 G	23, 25, 27, 28	T 17 (about).
O Z 62...	(?) O 23 c 97.88	100 G	28	N 15.
O Y 42...	(?) O 27 a 83.49	77 G	24	N 36.
O Y 25...	O 27 a 99.83	105 H	27	(?)
O Y 47...	O 27 a 24.62	77 G	28	N 20 d.
O Y 20...	O 27 a 72.51	105 H	24	U 1, N 36.
O Y 35...	O 27 b 02.59	77 G	23, 27, 29	(?)
O Y 70...	O 27 b 34.18	77 G	25	West.
O Y 24...	O 27 b 21.35	77 G	27, 28, 29	(?) T 6, N 21; direction N 21.
O Y 45...	O 27 d 61.02	77 G	25	S. W.
O Z 67...	O 28 a 09.37	105 H	24	(?)
O Z 121...	O 28 b 18.90	(?) H	23, 25	N 24 a.
O Z 123...	O 28 b 39.05	150 H	24, 25, 27	T 6, U 1.
O Z 126...	O 28 c 75.45	77 G	25, 27	South.
O Z 125...	O 28 c 63.66	(?) 105 H	27	(?)
O Z 12...	O 29 a 92.97	150 G	25	N 33.
O Z 37...	O 29 a 45.40	150 H	27, 28	South (?).
O Z 12....	{ O 29 b 00.93	150 G	24, 28	South, U 15.
	{ O 29 b 08.79	150 G	25, 27, 28	N 33.
O Y 51...	O 33 a 42.72	77 G	29	N 36.
O Y 52...	O 33 b 72.78	77 G	23, 24	T 6 (?).
O Y 79...	O 33 b 50.78	77 G	25, 28	T 6, S. W.
O Z 50....	{ O 34 b 33.99	(?) 150 H	25, 27	N 33, U 15 S. W.
	{ O 34 b 14.68	77 G	26	T 6 b.
O Z 31...	(?) O 34 b 92.84	150 H	28	T 21.
O Z 48...	O 34 b 18.33	77 G	27	T 12.
O Z 30....	O 35 a 30.53	150 H	28	(?)

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 107

Weekly intelligence of hostile batteries active during week ending May 30, and "K" list for week ending June 5, 1917—Continued.

SUSPECTED NEW POSITIONS.

Number.	Position.	Caliber.	Dates active.	Area shelled.
O Y 64...	O 21 a 27.60	77 G	28	South.
O Z 131...	O 22 b 70.20	(?) 150 G	24	(?)
O Z 132...	O 22 d 98.15	150 G	29	West.
O Z 137...	O 23 a 40.56	(?)	27	(?)
O Z 87...	O 23 c 95.00	100 G	23	T 6.
O Y 76...	O 27 a 70.39	(?)	24	Reoccupied.
O Y 77...	O 27 b 89.68	(?) 105 H	24	N 20.
O Y 78...	O 27 d 10.97	(?) 77 G	24	(?)
O Z 99...	O 28 a 23.52	(?) H	27, 29	N 20, N 21.
O Z 136...	O 30 a 42.36	H. V. G.	28, 29	N 33 (M 32 approx.).
O Z 135...	O 30 d 70.70	H. V. G.	29	M 32, 28.
O Z 133...	O 34 a 68.57	77 G	28	N 32, N 36.
O Z 134...	O 34 b 14.68	77 G	25, 28	(?) South.
P Y 20...	P 25 c 47.94	130 G	29	M 34 (?).

30-5-17.

CLAUDE R. JENKINS,
Second Lieut., Intelligence Officer Ninth Corps, II. A.

No. 5.

ELEVENTH DIVISION ARTILLERY INTELLIGENCE SUMMARY.

[For official use only. Not to be taken into the front line. 6 p. m. 14-6-17 to 6 p. m. 15-6-17.]

1. OUR ARTILLERY.

18-pounder or 4.5-inch.	Time.	Target.	Remarks.
Both.....	7.30 to 10.30 p. m.	Barrage up to Warneton line.	Occasional bursts.
Both.....	9.30 to 10.15 p. m.	Warneton line O 30.....	
18-pounders.....	11 to 5.30 a. m.	Warneton line O 30. Roads in O 24 b, c, and d.	Night firing.
4.5-inch howitzers.	11 to 5.30 a. m.	Buildings along road in O 30. Support trench in O 30 b and d. P 19 c 15.55, 40.65 and O 24 b 90.35.	
Both.....	6 a. m. to 5 p. m.	Partynatie farm. Trenches in O 24 a and c. Warneton line and O 30.	Day firing.

108 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

ELEVENTH DIVISION ARTILLERY INTELLIGENCE SUMMARY—Contd.

2. HOSTILE FIRE.

Time.	Nature of gun.	Number of rounds.	Area shelled.	Remarks.
8 p. m.	5.9.	20 H. E.	O 31 b.	Direction of fire Wervicq.
8.15 p. m.	4.2.	40 H. E.	Messines.	Occasional bursts.
8.30 p. m.-9 p. m.	4.2.	Shrapnel.	Track O 31 c N 36 d.	
9.30 p. m.-10.45 p. m.-3.45 a. m.	4.2 and 5.9.	(?) Number of rounds.	Messines - Wyt-schaete Ridge.	Scattered all along ridge from direction of Comines.
4.15 a. m.-5.15 a. m.	4.2.	25 H. E.	Fannys farm, O 32 a, b, and c.	Direction of Houtien. Light shelling.
10 a. m.-3 p. m.	5.9.	Numerous.	Front and support lines O 22 and O 28; road in O 21 c Wyt-schaete Ridge.	Intermittent.
12.05 p. m.-12.30 p. m.	5.9.	Numerous H. E.	Messines and ridge.	Heavy at times.
2.30 p. m.	4.2.	6 shrapnel.	N 30 w. c.	
4.30 p. m.-6 p. m.	4.2 and 77mm. (?)	Numerous.	Our trenches in O 28 b.	

Enemy fire.—Enemy artillery has been more active than usual during the last 24 hours. Most of the shelling was from 5.9 and 4.2 howitzers practically no 77 mm. fire being observed. H. V. guns were active against the back areas, specially against battery wagon lines in the Kemmel area. The majority of enemy fire comes from the direction of Comines, P 27 a, P 26 b and P 20.

Enemy aircraft.—Again very active during the evening and early morning. 8 E. A. flew over our positions at a low altitude, also 4 E. A. appeared to be patrolling our front lines. They were engaged by our antiaircraft guns.

Fires.—A building or dump close to Houthem Church was seen to be on fire at 11.30 a. m. Large fires were seen in Houthem and back areas between 11 a. m. and 1 p. m. Another fire was seen in O 23 a at 12.40 p. m. Reports of fires in back areas have been received at various times during the day.

General.—An E. A. flying low dropped two white and two red Very lights over O 33, with no apparent result. Flashes of a gun or howitzer were observed at T. B. 74° from O 27 a 05.60.

Weather.—Fine.

Visibility.—Bad, owing to ground haze.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 109

Later.—Between 4 and 6 p. m. the enemy heavily bombarded our trenches in O 28 a and O 22 d. This was still going on at 6 p. m.

NOTES ON OPERATION, 14-5-17.

(1). Our barrage started unevenly, the guns opened on O 22 b about 30 seconds before the rest of the line. The enemy sent up golden rain rockets, these continued until +8, all of them appeared to come from back areas. During the barrage enemy sent up 3 double Very lights.

The enemy opened at +4, when an 8-inch howitzer started on Mahiew farm. The fire gradually increased, the guns seeming slow in starting and until +9 the barrage consisted entirely of H. E. At +9 a battery using time H. E. opened up. Most of the fire was directed at our front and support lines, very little going into the back areas. The enemy fire was very inconsistent, occasionally breaking out with great violence.

Nothing below 4.2 was used and very few of these. Enemy fire consisted mostly of 5.9 and 8-inch howitzers with a few 4.2 H. V. guns, also one battery of 5.9 H. V. guns. Enemy fire apparently ceased at about 9.30 p. m.

(2). There was great activity on the part of enemy aircraft, 12 being seen in the air together. They flew along the line of attacking troops, then retired dropping white lights.

H. HIRSCHLAND,

JUNE 15, 1917.

Lieut., R. A., R. O., R. A., 11th Division.

SIXTEENTH DIVISIONAL ARTILLERY REPORT

[From 6 p. m. 3-6-17 to 6 p. m. 4-6-17.]

Our fire.—A bombardment with gas shell by our 4.5-inch howitzers was carried out according to program at 12.30 a. m. last night in and around Wytschaete and Wytschaete wood.

18-pounders fired on enemy communications and dugouts in the same neighborhood and in support of the same scheme.

All approaches to the line were kept under fire during the whole night.

To-day wire cutting has been continued in front-line wire with 18-pounders and 2-inch T. M.'s on N 24 a, b, c, d, N 18 b and d.

The bombardment of headquarters, trench junctions, O. P.'s and dugouts by our 4.5-inch howitzers and 9.45-inch T. M.'s has continued during the day with excellent results.

110 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Ammunition expended: A. and A. X., 7,763; B. X., 1,107; ¹ gas shell, 2,363; 2-inch T. M.'s, 1,241; 9.45-inch T. M.'s, 160.

Retaliation for our oil drum bombardment at 12.30 a. m. was weak, about 25 5.9-inch howitzers are reported near S. P. 13.

Gas shells were fired during the night into N 15 d; N 16 a and c on three occasions from 10 p. m. to 3 a. m.

During the day the enemy has shelled N 15 b and d; N 16 a and N 21.

GENERAL.

Hostile aircraft.—From 8.15 to 8.45 p. m. on the 3d, 3 hostile planes were over our lines flying very low. They reconnoitered N 16, and surrounding country. No attempt was made to deal with them whatsoever, by antiaircraft, rifle, or M. G. fire. At 11.05 p. m. a hostile machine flew over Siege farm.

Movement.—At 2.20 p. m. 50 men were observed to leave Naples Reserve at N 24 d 75.10, and make in the direction of Petit Bois.

A. R. LIELER,

*Lieutenant, R. A., for Brigadier General,
Commanding, Sixteenth Divisional Artillery.*

NINETEENTH DIVISIONAL ARTILLERY INTELLIGENCE SUMMARY

[From 6 p. m. 14-6-1917 to 6 p. m. 15-6-1917.]

OPERATIONS.

Our artillery.—At 7.30 p. m. batteries carried out program as ordered in Nineteenth Divisional Artillery Operation Order No. 125 in support of the infantry raid. During the night, the following points were engaged: Canal Bridge at O 12 b 4.5, bridge at P 13 d 7.2, house and road at O 18 c 55.60, houses at O 24 a 4.3 and O 24 c 3.9, O 18 d 8.4, O 23 b 6.9, crossroads and house O 23 b 08.55, O 18 c 4.0—50.05, trenches in O 18 c and d and O 24 a, and road from O 24 a 55.90—7.3. S. O. S. lines were also fired on during the night and the enemy's communications kept under fire during the night.

During the day the following targets were fired on: Verhaege farm O 22 b 8.1, trenches in O 18, Green wood at O 17 c 40.99, Korte Wilde (4.5-inch howitzers). As punishment for hostile shelling, group bombardments were ordered and carried out at the following times: 4.55 p. m., 5.15 p. m., 5.55 p. m., and 6.15 p. m.

Trench mortars.—Nil.

¹ All reports for 4.5 inch howitzers not yet received.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 111

Hostile artillery.

Time.	Locality shelled.	Rounds.	Nature.	Direction.
7.30-9.45 p. m...	Wyt-schaete vil-lage and ridge.	.....	Light barrage. 10-cm H. V... 10.5-cm..... 15-cm..... 7.7-cm..... 10-cm.....	
7.45 p. m.....	Oostaverne wood. Onraet Wood O 21 b.	Numerous.....	15-cm.....	
9.30 p. m.....	Vierstraat-Wyt-schaete Road.	6.....	15-cm G.....	TSB from O 13a 6.0-77°.
6-7 a. m.....	Oostaverne wood.	Intermittent..	15-cm.....	
6.30 a. m.....	Ravine wood....	15.....	7.7-cm..... 10.5-cm.....	
9-12 noon.....	O 13 d.....	Intermittent..	10-cm G. and H.	
9.30 a. m.....	O 8 d.....	Numerous.....	15-cm.....	
10 a. m.....	N 12 d and N 18 b.	7.....	10-cm G.....	TSB from N 12 d 1.0-90°.
11.30 a. m.....	O 22 a and c....	10.....	10.5-cm G.....	O 18.
12 noon.....	O 20 c 2.8.....	2.....	15-cm H.....	
2.30 p. m.....	(?)	.....	15-cm.....	P 21.
3 p. m.....	N 12 d and N 18 b.	6.....	15-cm H.....	TSB 100° from N 12 d 10.
3.15 p. m.....	O 13 d 3.8.....	12.....	7.7-cm and 10.5-cm.....	
3.30 p. m.....	Unnamed wood and Wyt-schaete ridge.	8.....	10.5-cm.....	
4.15 p. m. and 4.55 p. m.	O 19 b.....	20.....	10-cm G.....	O 24 from O 19 b 7565. O 18.
4.35 p. m. and 5 p. m.	O 19 d.....	3.....	10-cm G.....	
		6.....	15-cm H.....	
		2.....	15-cm H.....	
4.50 p. m. and 6.10 p. m.	Heavy barrage on and beyond our F. L. T. in 19th and 41st division fronts.	.....	10.5-cm 15- cm and 21- cm G.	
During morning	O 20 d.....	Uncounted....	21-cm G.....	P 33 by sound from North house.
During the day.	O 20 a and d, O 21 a, O 22 a and b.	Intermittent firing.	10.5-cm H, 15- cm	Zandvoorde by sound from North house.

INTELLIGENCE.

Hostile artillery.—During the raid by our infantry on the evening of the 14th, the enemy put up a barrage as follows:

At zero plus 3 minutes high black bursts on line O 21 b central to 21 d central.

These changed at zero plus 5 minutes to 15-cm howitzer H. E. percussion bursts with direct-action fuses.

112 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

At zero plus 10 minutes the enemy barrages line from Estaminet O 20 a 3.9 to Stagnyzer Cabt. O 20 c 2.8 with similar projectiles. There were also two 15-cm guns firing from the direction of Comines along the road from Stagnyzer Cabt. to Wytschaete Church. There was a noticeable gap in the enemy's barrage at O 21 b 4.9, but the southern limit could not be distinguished. There was a lack of 7.7-cm activity and this has been noticeable throughout the day.

No counter-battery work is reported, the enemy's barrage being confined to our front line and searching forward areas.

On the 15th the enemy assisted us in the shelling of Verhaege Farm.

At 4.45 p. m., 15th instant, the enemy began a fairly heavy bombardment of our lines. Group bombardments were fired as under "Our artillery" in reply and at 5.20 p. m. it was reported that the enemy shelling had practically ceased, and that everything was quiet again at 6.10 p. m.

The enemy has carried out the usual searching of the ridge for working parties. The following squares particularly receive attention O 20 a and d, O 21 c, O 22 a and b. Gasshell are reported to have fallen in O 20 d, the present method of fire appears to be section salvos searching 100 yards. The shelling of above squares appeared to come from the direction of Zandvoorde.

Aircraft.—On the evening of the 14th there was much hostile aircraft activity, chiefly between 8 p. m. and 9 p. m. Several skirmishes took place with our machines, but no casualties are reported on either side.

As many as 12 enemy planes were reported over our lines at the same time at 8 p. m., 14th, and some of these flew over our battery positions during our bombardment in support of the raid. Our A. A. batteries dealt effectively in driving off batches of enemy planes on several occasions. Again on the morning of the 15th between 8 a. m. and 9 a. m. enemy planes were over our lines, two flying very low. Shortly after they appeared a 15-cm battery began shooting on Wytschaete Ridge.

Miscellaneous.—A large fire was seen burning behind enemy lines at 3 a. m.

D. A. HEADQUARTERS,
June 16, 1917.

W. E. H. METCALFE,
Lieut., R. A., for Brigade Major,
19th Divisional Artillery.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 113

THIRTY-SIXTH DIVISIONAL ARTILLERY DAILY REPORT.

[6 p. m. May 31, 1917, to 6 p. m. June 1, 1917.]

Our fire.—Night firing on an extensive scale on enemy's communications into his reserve and support lines.

During the day wire cutting by 18-pounders and 2-inch trench mortars; report appended.

Our 18-pounders bombarded Naples Avenue, Ocean Avenue, Occasion Switch, Naples Drive, and other trenches and approaches.

Our 4.5-inch howitzers continued their destructive fire on strong points, dugouts, and emplacements, paying particular attention to the road and cutting running north from Scott's farm.

Our 9.45-inch heavy trench mortar fired 32 bombs on N 30 b 00.08 and N 36 b 65.88.

Total ammunition expended:

	Rounds.
A.....	7,386
A. X.....	2,685
B. X.....	3,861
9.45-inch.....	32
2-inch.....	200

Hostile fire.—Active on roads and back areas during the night. There was heavy shelling by 15-cm howitzers, 10-cm guns, and 7.7-cm guns on N 33 a during the afternoon. Trench mortars showed some activity at 11.15 a. m. on N 29 d 0.5.

Wire cutting.—The following wire was successfully engaged:

N 30 c 98.92—N 30 c 97.95	N 36 a 99.80—N 30 c 97.28
N 30 c 97.28—N 30 d 08.60	N 36 b 18.50—N 36 b 15.55
N 30 a 45.65—N 30 a 45.60	N 30 Central—N 30 b 35.42
N 36 a 98.80—N 36 b 20.60	N 30 b 35.42—N 24 d 55.46
N 24 d 97.10—O 19 c 16.58	

R. B. SOLOMON, *2d Lieut., R. F. A.,*
for Brigadier General,
Commanding 36th Divisional Artillery.

JUNE 1, 1917.

NINTH CORPS HEAVY ARTILLERY.

Tactical report, our fire, June 8-9, 1917.

8-6-17.—At 11.25 a. m., in response to an S. O. S. call, a barrage was put up in O 22 b, O 23, O 24 b, O 29 b; at 12.15 p. m. the situation was reported normal.

114 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Ammunition expended:

	Rounds.
9.2-inch howitzer.....	236
8-inch howitzer.....	46
6-inch howitzer.....	398

At 6.50 p. m., in response to an S. O. S. call, a barrage was put up in O 17 a, O 23 b d, O 29 b; at 7.15 p. m. the situation was reported normal.

Ammunition expended:

	Rounds.
9.2-inch howitzer.....	143
8-inch howitzer.....	44
6-inch howitzer.....	103

At 9.10 p. m. a further call for assistance was received and the barrage was repeated; at 10.05 p. m. the situation was reported normal.

Ammunition expended:

	Rounds.
9.2-inch howitzer.....	210
8-inch howitzer.....	65
6-inch howitzer.....	509

During the day and night the bridges between Houthem and Karentje, and during the night roads and approaches were kept under fire.

Ammunition expended:

	Rounds.
6-inch Mark VII.....	117
6-inch howitzer.....	93
60-pounder.....	309

During the afternoon Undaunted Trench U 11 b was bombarded with 6-inch howitzers, with aeroplane observation.

Ammunition expended, 300 rounds.

Six registrations were carried out with aeroplane observation.

C. P. S. CAMERON,

Captain, R. A., Brigade Major Ninth Corps H. A.

JUNE 9, 1917.

SECOND ARMY SUMMARY OF INTELLIGENCE.

[June 1 to 15, 1917.]

THE BATTLE OF MESSINES.

General.—Since the date of the last fortnightly summary our troops have attacked and captured by a single concentrated effort the Messines-Wytschaete Ridge, one of the enemy's most important

strongholds on the western front. Dominating, as it did, the Ypres salient and giving the enemy complete observation over it, he had neglected no precautions to render the position impregnable. He was able to overlook all our preparations, and it is evident from documents subsequently found that he had full knowledge that an attack was impending and had moved up reinforcements of guns and troops. The battle, therefore, was a gauge of the ability of German troops to stop our advance under conditions as favorable to them as an army can ever hope for, with every advantage of ground and preparation.

The forward defenses of the Messines-Wytshaete Ridge consisted of an elaborate and intricate system of well-wired trenches and strong points forming a defensive belt over 2,000 yards in depth. The numerous farms and woods were thoroughly prepared for defense and the whole face of the ridge was thickly dotted with strongly constructed and well-concealed concrete machine-gun emplacements and liberally sprinkled with concrete dugouts, designed to protect the garrison from the effect of our bombardment. Nothing that experience could suggest or incessant labor produce was left undone to render the ridge an impregnable barrier against which he hoped the waves of our attack would break.

Artillery preparation.—Systematic trench bombardment and wire cutting was commenced on May 21 and was intensified about May 28. The wire of the front and support lines was cut by trench mortars and 18-pounders and of the rear lines by 6-inch howitzers with aeroplane observation. Night firing commenced on May 27-28. Billets, headquarters, and villages in back areas were shelled by long-range pieces and a continuous barrage was maintained on the enemy's communications. During the 10 days before the assault an unprecedented amount of very successful destructive counter-battery work was carried out in the most thorough fashion, and the last three days before the attack was devoted to intense counter-battery work. Information as to the effect of our counter-battery work was afterwards obtained from a captured German N. C. O., who stated that 11 guns, including 4 heavy, were knocked out on the night of the 6th-7th near Kortewilde.

The enemy also made determined efforts to knock out our batteries and for the last few days there was a continuous artillery duel. His use of gas shell caused our artillery great inconvenience and some casualties; one case is reported of a gun being manned and worked during the earlier part of the barrage by the sanitary orderly and two battery cooks, the detachment being temporarily hors de combat.

116 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Raids.—Raids were made every night during the week prior to the attack, identifications being fully obtained and the enemy's order of battle established. The most successful raids were made by following up practice barrages on the afternoons of the 3d and 5th, about 100 prisoners being captured on both occasions.

Gas.—Gas was discharged and projected frequently against the enemy lines during the period preceding the attack.

The attack.—At 3.10 on the morning of June 7, following the explosion of 19 deep mines containing an aggregate of 937,000 pounds of explosive, which blew up large portions of the enemy's front and support line along the offensive front, our guns opened and the infantry assault was launched.

The wire cutting and trench bombardment had been wonderfully effective and within a few minutes the enemy's front-line system was carried on the whole front attacked. Following closely on the heels of the barrage our troops pressed on with scarcely a pause up the western slopes of the ridge and within three hours after the commencement of the attack had stormed the entire crest line from south to north. By 10 a. m. our troops had captured the villages of Wytschaete and Messines and reached without serious check (except in the case of Battle Wood north of the Ypres-Comines Canal) a line running east of these villages, east of the Dammstrasse and White Chateau.

At 2.30 p. m. the enemy started to launch a counter attack, which was crushed by our artillery and infantry fire. A halt of about five hours was made on the line east of Messines, which was consolidated, and during the interval preceding the second stage of the attack, the artillery was concentrated in cutting wire on the final objective, the Oostaverne line stretching like a cord across the base of the Wytschaete salient. At 3.10 p. m. a further advance was made and fresh troops pushed down the eastern slopes of the Ridge and in the course of an hour captured and occupied the final objective of the day, the Oostaverne line, except a small portion east of Messines, which was taken on the morning of the 8th. During the night of the 7th and the greater portion of the next day, the enemy made no serious attempt to recapture the lost ground, except some spasmodic counter-attacks, and the fullest use was made of this time to consolidate our new positions.

Tanks.—The attack was supported throughout by tanks which did everything required of them; the infantry, however, were everywhere so completely successful that this arm had little opportunity of exercising its full offensive power.

The principal areas of tank activity were the Dammstrasse, east of Wytschaete and along the Oostaverne line.

Counter attack.—At 7 p. m. on the 8th, after heavy bombardment, a strong counter attack was launched against the whole of our offensive front, but was easily repulsed with heavy loss to the enemy.

After the battle.—On the 14th we advanced our line in the neighborhood of Battle Wood, and a deliberate advance has also been made between Oostaverne and Frelinghien, which was entirely successful, advancing beyond the Oostaverne line a maximum of about 1,000 yards on to a well-chosen line of defense now established. A patrol also succeeded in entering Frelinghien on the afternoon of the 15th, obtaining prisoners.

Prisoners and material captured.—The total number of prisoners taken in operations from 6 p. m. 4th to the night of June 14 (latter inclusive) was 144 officers and 7,210 other ranks, and the material captured, 48 guns, 218 machine guns, and 60 trench mortars.

ENEMY'S DEFENSES.

An inspection of the Messines-Wytschaete system of defenses reveals the tremendous amount of work which the enemy had lavished upon this area. Concrete abounds everywhere—machine-gun emplacements, observation posts, and large dugouts. In the support trench of the Spanbroek sector and to the south large concrete dugouts occur at intervals of about 75 yards. It was seen that in some instances structures of solid concrete had resisted our shell fire, but where concrete blocks were used in many instances the structure was knocked over in such a way as to render it useless and a trap for the occupants.

The general plan of his trenches indicates that he expected perhaps that we would get his front and possibly his support line, but that he would hold up an attack in front of the line which continues around the slopes just below the crest on the western face of the ridge, e. g., on such lines as October, Ocean, and Obvious trenches, Jump and Skip points. The arrangement of the enemy trenches and even trench mortar emplacements, some of which were found on the eastern edge of L'Enfer Wood and in the rear part of Wytschaete, tends to confirm this. He did not appear to have any wire on the inside of his "all-round" defenses of Wytschaete at the rear (east), nor were his trenches here arranged for fire westward; it did not appear that he expected we might go through his defenses on the west side of Wytschaete so readily.

118 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Beaten from the Wytschaete Ridge down the eastern slope and compelled by our pressure to evacuate his front-line system north of the Lys, the enemy is now occupying, at any rate temporarily, the Warneton line, with advanced posts in shell holes in front. He has made little attempt to repair this line, which is badly shot about and almost derelict in places, and indications at present are that he does not intend seriously to resist on this line. Behind the wire on the east of the canal recent photos show a series of holes, and he may be engaged in hasty efforts at trench construction here. A great deal of work has been done behind the wire of the Tenbrielen switch line running in front of Zandevoorde and Tenbrielen. Strong points have been linked up by trenches, still shallow, practically all along the line. A little distance behind this a support line has also been traced out.

AERIAL ACTIVITY.

The following work was done by the R. F. C. prior to and during the battle:

From June 1 to 7, both inclusive, 32 enemy machines were crashed and 33 driven down out of control. We lost 18 machines in 215 combats. A great amount of photographic work was done, 231 batteries were engaged for destruction, 225 trench bombardments were carried out, 716 zone calls were sent down, besides much miscellaneous work; 612 hours average daily flying was done.

During operations our machines carried out continual reconnaissances reporting much enemy movement and bombing and engaging with machine-gun fire from low altitudes concentrations of hostile troops and transport. Contact patrols were carried out continuously from dawn to dusk. It was remarked that the number of hostile single-seater scouts had increased considerably, his artillery and reconnaissance machines remained normal and carried out little successful work.

Most useful work was done by kite balloon observers on the 7th, reporting the intensity and extent of enemy barrages, progress of our own barrages, sections of hostile artillery activity centers and the progress and location of tanks.

ARTILLERY.

During our attack the enemy's barrage was nowhere heavy and was principally on the flanks. Many of the enemy's barrage batteries immediately east of Wytschaete had been put out of action or withdrawn and very little hostile fire was experienced in this area.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 119

On the day of the attack the enemy disclosed about 12 new positions on the northern and 20 on the southern flanks of our offensive. Subsequently most of the hostile fire has come from these flank batteries, i. e., from Polygon Wood group and Quesnoy group, and has been mainly directed against our new front lines, back areas being comparatively quiet.

Our successful attack has brought about a regrouping of the hostile artillery. On our northern flank the main group is near Zandvoorde and no material withdrawal is noticeable in this area. On the 8th of June the former Wytschaete group was withdrawn west and southwest of Houthem. Most of these batteries have subsequently been withdrawn east of the canal. The River Lys group, immediately after our attack, concentrated east of Bas Warneton. During the last two days this group has been abnormally quiet and is probably being withdrawn to neighborhood of Comines.

There are as yet no signs of any further big reinforcements of enemy batteries. Documents have verified our estimate of enemy guns per division, i. e., about 70, and the subsequent increase prior to the attack to about 90.

464 destructive counter-battery shoots were carried out by our Artillery in the last ten days before June 7, and 167 from the 7th to 13th. The hostile counter-battery work was fairly heavy at the commencement of our bombardment, but decreased and became very erratic the last few days before our attack. Since June 7 there has been very little organized enemy counter-battery work.

DISTRIBUTION OF ENEMY'S FORCES.

In consequence of the operations undertaken against the positions in the Wytschaete-Messines salient, the disposition of the enemy's forces has undergone complete change.

Before the battle.—During the fortnight previous to the period under review the enemy had rearranged his defense, so as to bring three divisions instead of two into line between the Ypres-Comines Canal and the River Douve.

On June 1 the Thirty-fifth Division from reserve relieved the Twenty-fourth Division north of Wytschaete, and about June 4 a regrouping of the Bavarian units between the Douve and the Lys took place in consequence of the withdrawal of the Fifth Bavarian R. I. R. (Fourth Bavarian Division) owing to its heavy casualties. It was relieved by the Ninth Bavarian I. R. (Fourth Bavarian Division), and the Ninth Bavarian I. R. was replaced in its former

120 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

sector by the Twenty-first Bavarian R. I. R. (Sixteenth Bavarian Division) from east of Armentieres.

The Third Bavarian Division in reserve was brought up into close support southeast of Messines.

The order of battle at 3 o'clock the morning of June 7 was thus from north to south on the army front:

Two hundred and fourth Division south of Hooze to just north of the canal.

Thirty-fifth Division north of the canal to north of Wytschaete. Second Division in Wytschaete sector.

Fortieth Division in Messines sector.

Fourth Bavarian Division (less Fifth Bavarian R. I. R.) reinforced by Twenty-first Bavarian R. I. R. (Sixteenth Bavarian Division) between rivers Douve and the Lys.

Enemy's intention.—All evidence shows that the attack was fully anticipated by the enemy, although it was made a few days before he expected it. His intention was to relieve the three divisions in the Wytschaete-Messines salient, which had been greatly tried by our artillery preparations, by fresh divisions. In fact the Fortieth Division was actually in process of relief by the Third Bavarian Division when our attack was made, as prisoners of both divisions were found mixed up together.

In the attack.—As it was, his troops in the line, in spite of every possible preparation, were unable to offer the resistance he expected, and except in isolated cases, completely broke under the attack.

Causes of enemy collapse.—The following are the causes to which prisoners attribute the enemy's failure to stop our attack and which brought about his collapse:

1. Our attack was not expected so soon.
2. The troops were exhausted by our artillery preparation.
3. The destruction of their artillery by our counter-battery work had been so great that it was no longer able to adequately support their infantry, either before or during the attack.
4. The mines exploded at zero.
5. Lack of rations and water owing to the difficulty of getting them up.
6. Our gas shells which caused many casualties.
7. Confidence in the strength of their positions to hold up the attack, orders having been given "to hold the Messines Ridge at any cost."

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 121

Evidence of documents also shows his need for economizing ammunition.

Enemy's losses.—The Second, Thirty-fifth, and the Third Bavarian Divisions bore the brunt of the attack, and their great losses, both in casualties and prisoners, have effectively destroyed their value.

On the flanks the Two hundred and fourth Division north of Ypres-Comines Canal lost a considerable number of prisoners, and was chiefly concerned in the fighting in and about Battle Wood.

Elements of the Fortieth Division were caught during the relief by the Third Bavarian Division in Messines sector.

On the south the Ninth and Fifth Bavarian Infantry Regiments (Fourth Bavarian Division) suffered heavy losses also.

Counterattacks.—There was little interference with our establishing ourselves on the Oostaverne line, but during the evening of June 7 a counterattack was made east of Messines by the First Grand Reserve Division, brought up to relieve the Third Bavarian Division. This counterattack failed.

During the night of June 7-8 the Seventh Division was brought up to relieve the Thirty-fifth Division and the Twenty-fourth Division to relieve the Second Division.

In the enemy's large counterattack on the evening of June 8 the Seventh Division, Twenty-fourth Division, and First Grand Reserve Division, with elements of the Fourth and Sixteenth Bavarian Divisions, all took part. This counterattack also failed, the Seventh Division in the north and again the First Grand Reserve Division in the south, according to prisoners' statements having suffered particularly heavy.

Enemy reinforcements.—The Eleventh Division was brought in on June 9 from reserve, and its units were used to reenforce the line in three different places. The Thirty-eighth Fusilier Regiment came into line north of Ypres-Comines Canal, the Fifty-first Infantry Regiment reenforced the Seventh Division and the Tenth Grenadier Regiment reenforced the Twenty-fourth Division.

In the extreme north, the Four hundred and fourteenth I. R. of the Two hundred and fourth Division, in reserve, was brought in about Klein Zillebeke.

The disorganization of the enemy during June 7 may also be gathered from the fact that he put into line the Thirty-eighth Land-sturm Infantry Regiment, and certain pioneer units, which were normally engaged on road repairs in the rear.

Withdrawal.—On or about June 10 the Twenty-fourth Division was withdrawn to rest in Lille.

122 ARTILLERY OPERATIONS, MESSINES, JUNE, 1917.

Documents show the extension southward of the Fourth German Army front to include "A Lille group" of divisions.

On June 12 the enemy was suspected to be withdrawing from his original front line north of the Lys, and this proved to be correct. Prisoners of Fourteenth Bavarian I. R. (Fourth Bavarian Division) captured near Frelinghien reported the presence of the Ninth Reserve Division north of them, but no confirmation of this report has come in.

Reorganization of enemy units.—From June 11 to 14 the enemy was occupied in reorganizing his defense. To accomplish this he has relieved all the divisions which had been holding the line on the army front.

Our operations on the night of June 14 permit an accurate identification of the hostile divisions now facing the army front to be made, and these are shown on the accompanying disposition map.

Enemy's new position.—The enemy is now occupying the Warnton line of defenses and is clearly adopting the plan of placing strong advanced posts in front of this new position, and refraining from holding any marked forward line.

Statement of prisoners as to the method of holding of the new position are conflicting but as the prisoners are nearly all new to the line, their statements are not to be relied on.

The number of fresh divisions now opposite this army front shows the enemy to be in strength, and certainly disposed in considerable depth. He also has a strong reserve of fresh divisions.

ARTILLERY OPERATIONS, MESSINES, JUNE, 1917. 123

Enemy order of battle, June 15.

Division.	Sector.	Division relieved.	Date.	Remarks.
One hundred and ninety-fifth (Prussian).	North of Ypres-Comines Canal.	Two hundred and fourth.	June 5	Withdrawn from Hooge sector beginning of June, appears to have relieved Two hundred and fourth Division north of canal.
Twenty-fourth (Saxon).	Hollebeka.....	Seventh.....	June 14	Relieved the seventh Division on night of June 14; the Twenty-fourth Division reinforced the line after June 7 in O 22—O 28 and was withdrawn about June 11 to rest in Lille.
Eleventh (Prussian and Polish).	Wambeka.....	Regrouped.....	June 10	Has been reinforcing this line since June 10. Originally split up but its units are now grouped together in Wambeka sector.
Two hundred and seventh (North Prussian).	Douve.....	First Grand Reserve Division.	June 12	Relieved the First Grand Reserve Division on night of June 12 east of Messines. Came north from line in Queant sector.
Twenty-second Reserve (Prussian).	Warneton.....	Fourth Bavarian Division.	June 13	From rest in Lens area. This division came into line on night of June 13. It has not seen much fighting this year.
Sixteenth Bavarian.	Lys.....	Reinforcing.....	June 6	From east of Armentieres; has reinforced the line north of the Lys.

In the absence of direct identifications the divisions in reserve can only be given subject to confirmation, but of the following any or all may be behind the Army area.

RESERVES.

Twelfth Division (Prussian and Polish). Reported as leaving eastern front and mentioned by prisoners as being in Flanders.

Twenty-third Reserve Division (Saxon). Withdrawn from north of Ypres end of May.

Thirty-sixth Division. Is reported to be in reserve in Ypres salient, having come up from the Scarpe area.

Thirty-sixth Reserve Division (Prussian). From Russia, confirmed by two independent statements and letters in Tournai.

Thirty-eighth Division (Prussian). Reported by prisoner of war to be in reserve in the Lens area, as coming up from the Lens area; has seen much fighting at Arras.

Thirty-ninth Division (Prussian and Alsatian). Identified by prisoners' statements as being in Menin area.

Forty-eighth Reserve Division (Prussian). From Russia, reported to have arrived in Flanders in May.

Second Bavarian Division. Reported by several prisoners of war to be in reserve in Comines area. Withdrawn from Aisne battle.

A naval division. The naval units withdrawn from Ypres about May 25 are still in reserve.

DIVISIONS HEAVILY ENGAGED AND WITHDRAWN

Second Division, Thirty-fifth Division, Third Bavarian Division. These three divisions have certainly suffered extreme losses, and in the case of Thirty-fifth and Third Bavarian, a second time in two months.

Seventh Division, First Grand Reserve Division.—By the attack and losses in the line may be considered very exhausted. Suffered severely in counterattacks of June 7.

Fortieth Division, Two hundred and fourth Division.—Likely to be engaged, but their losses, especially the Two hundred and fourth Division, have been very considerable.

MORALE.

Generally speaking the morale of prisoners taken is even better than might have been expected. A notable feature is their complaint against their artillery lack of support. Relations between the infantry and artillery seem at all happy. Many prisoners have stated that they would be willing to save the guns.

Lieut. Col., G. S., for Major General, G. S., Sec

C. H. MITCHELL

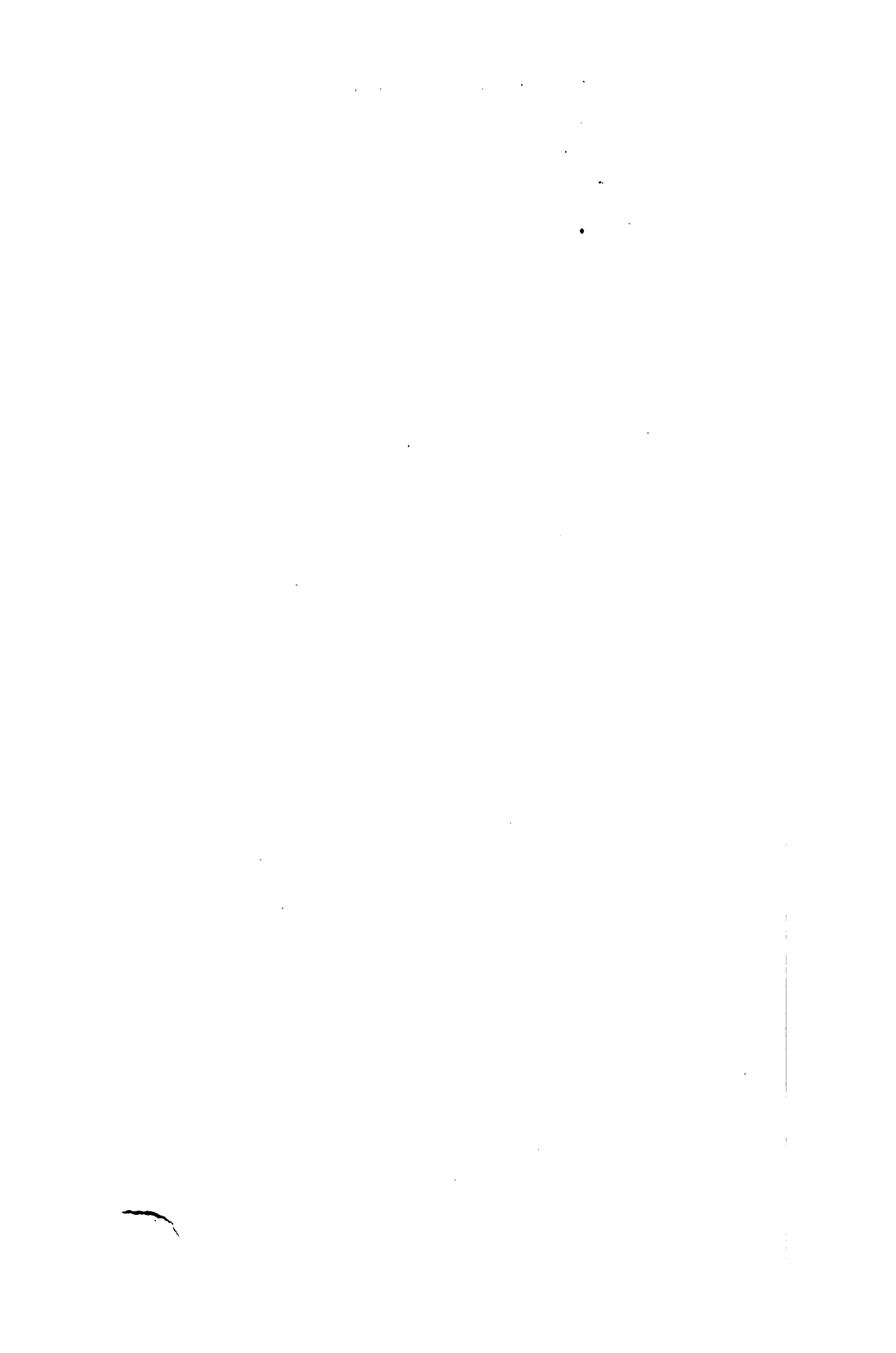


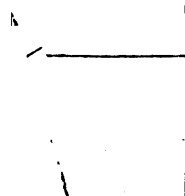
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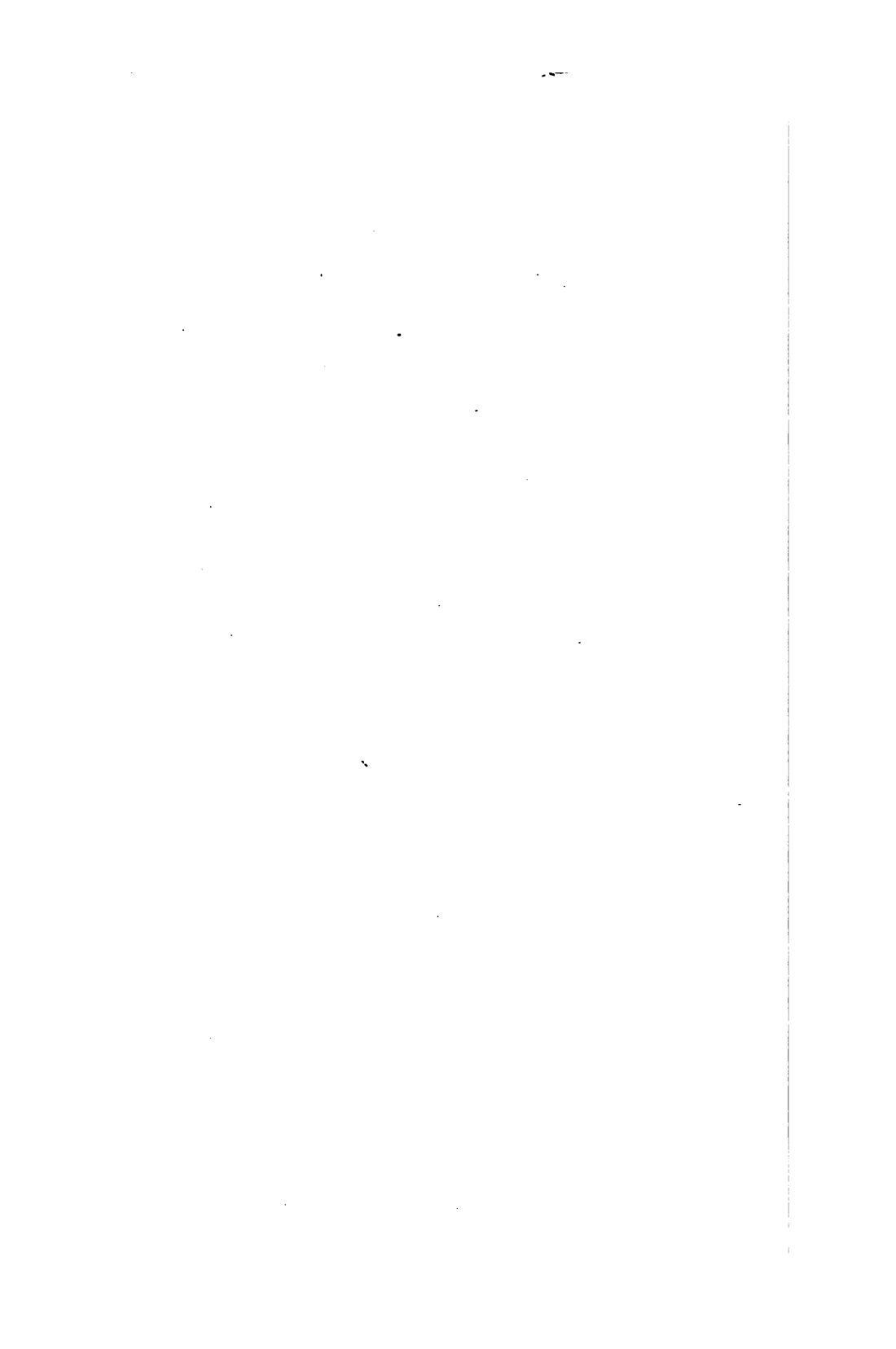
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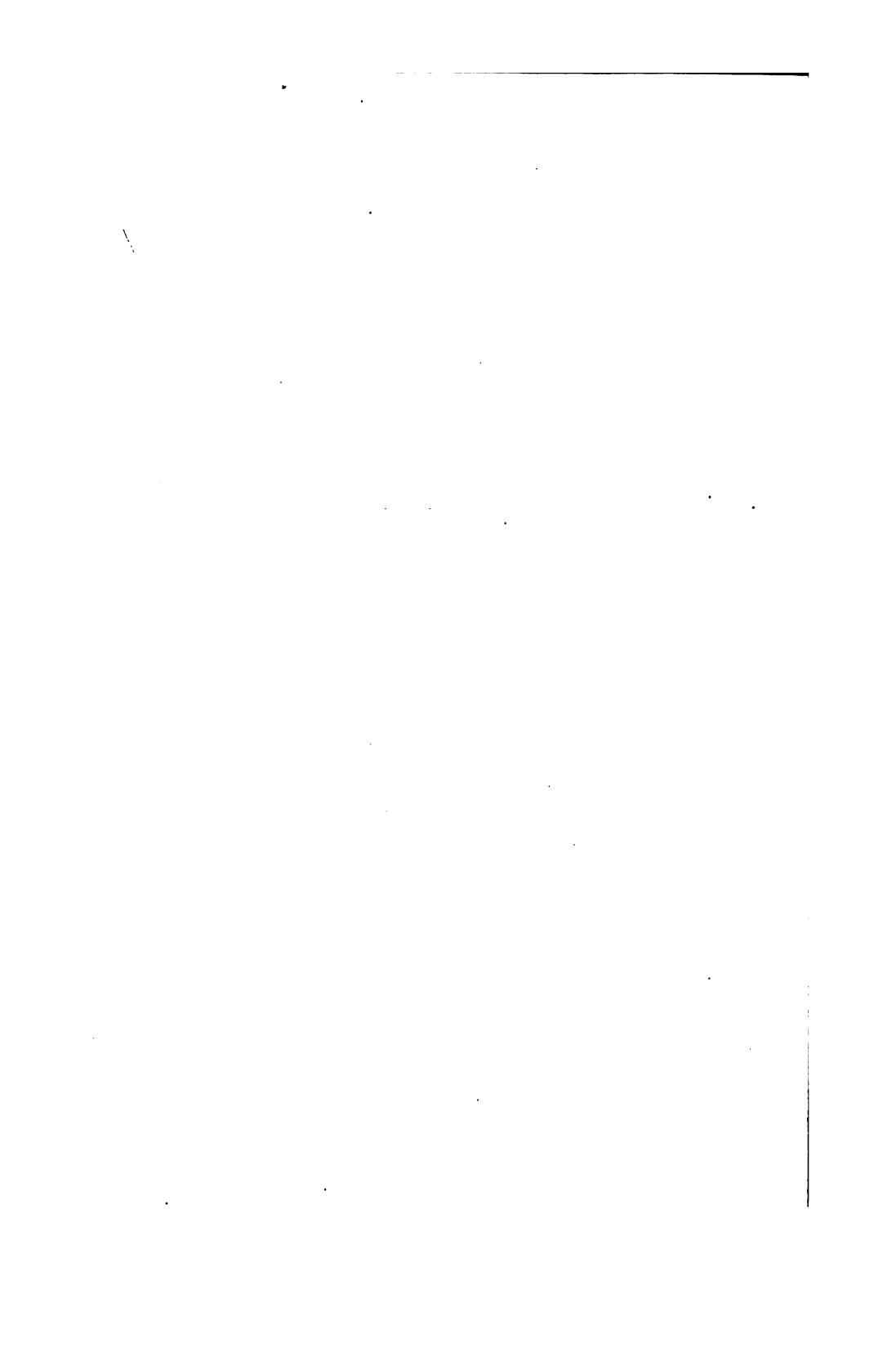
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